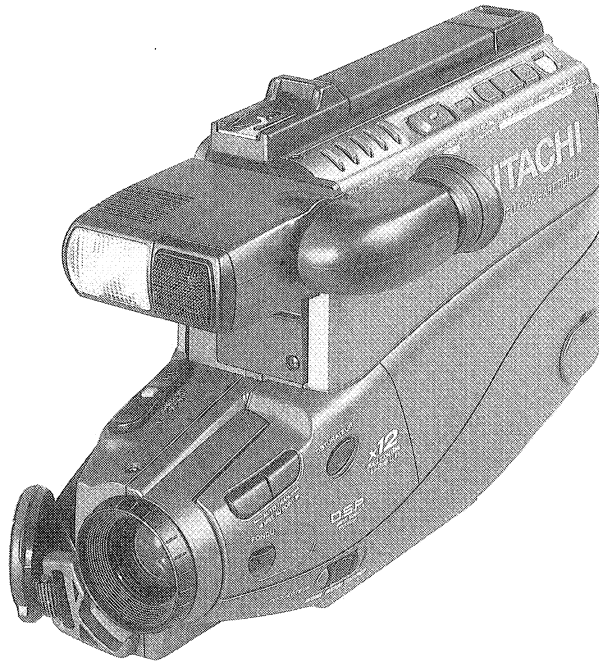


# HITACHI

## VIDEO CAMERA/RECORDER

### VM-2700E



#### **Instruction manual**

**page 2**

To obtain the best performance and ensure years of trouble-free use, please read this instruction manual completely.



## FEATURES

### Single-Unit Convenience and Ease of Operation

Your video camera/recorder combines the functions of a video camera and a video tape recorder in one lightweight, easy-to-use instrument. This eliminates interconnecting cables and simplifies operation.

### Standard VHS Cassettes Mean Interchangeability

Because the camera/recorder uses standard VHS video cassettes, tapes recorded by the camera/recorder can be played back by the camera/recorder or by any other VHS video cassette recorder.

### Auto Focus Power Zoom Lens

The 12:1 autofocus zoom lens automatically maintains focus and allows you to zoom in and out for close-ups or wide angle shots by simply touching the zoom switch. Macro feature permits use as close as 3 cm from the subject.

### Video/Audio Dub

Video and audio dubbing allows you to simply and quickly insert new video and audio into existing tapes. Audio dubbing allows you to insert new audio without erasing the original video.

### Fade-in/Fade-out

Use this function to make the picture appear and disappear gradually.

### Built-in Camera Light

### High Speed Shutter

Use this feature to shoot tennis and golf shots that contain rapid movement. You can replay the still pictures at the crucial moments.

**HQ**

The Video Camera/Recorder with this marking incorporates **VHS** high-quality picture technology and is compatible with any Video Camera/Recorder bearing the mark.

This product is manufactured to comply with the radio interference requirements of EEC Directive 76/889/EEC & 82/499/EEC, 87/308/EEC.

## PRECAUTION

### ■ No water, dust or sand

Be careful that no water, dust or sand enters the Camera/Recorder because it may cause trouble and accidents.

### ■ Do not leave the viewfinder lens facing sunlight for a prolonged period, or the phosphorescent surface of the cathode ray tube may be damaged.

### ■ When you shoot at a scene which contains an extremely bright object such as the sun or a light source, a bright vertical bar may appear in the picture.

Your camera/recorder is functioning properly, but the solid-state pickup device (CCD) usually causes this as an inherent characteristic.

Try to avoid shooting an excessive bright object directly.

### MOISTURE

Avoid operating your camera/recorder immediately after moving it from a cold area to a warm humid area. Leave the camera/recorder for 2 to 3 hours to reach the ambient temperature before inserting a video cassette.

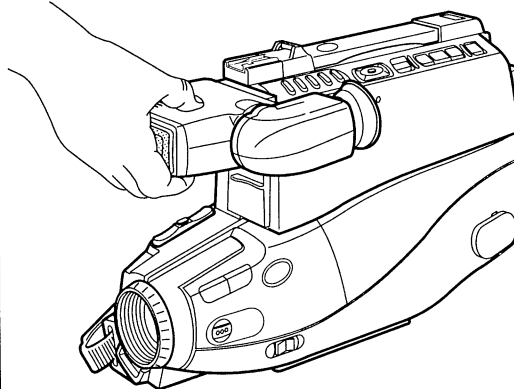
When moved from a cold area to a warm humid area, moisture may condense on the head drum inside the camera/recorder. This moisture could cause the tape to stick to the headwheel and damage the headwheel or tape.

**BE SURE NOT TO LEAVE IT IN A PLACE AT HIGH TEMPERATURE EXCEEDING 50°C, OR ITS INTERNAL PARTS MAY DETERIORATE. BE CAREFUL NOT TO LEAVE THE UNIT IN THE FOLLOWING PLACES:**

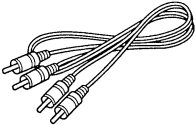
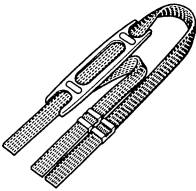
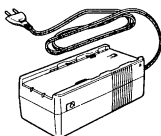
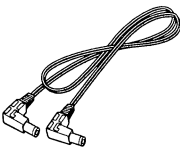
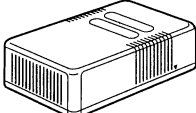
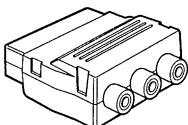
- \* Inside a car with the window closed and in direct sunshine.
- \* Near heating appliances.
- \* In direct sunshine in summer.

### CAUTION:

Do not hold the unit by the viewfinder when carrying as this could cause a malfunction.

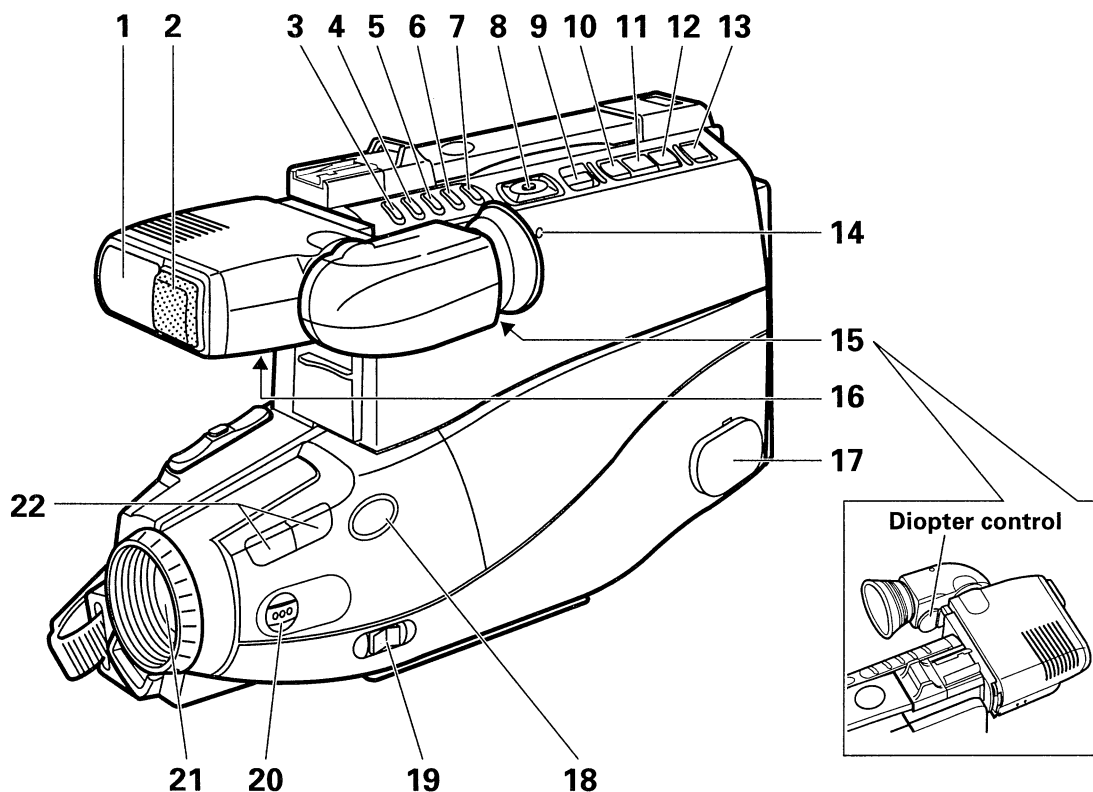


## ACCESSORIES

① Audio/Video Cable 	② Shoulder Strap 	③ AC Adaptor/Charger  VM-AC67E	④ DC Cord 	⑤ Battery Pack 
⑥ AV Plug Adaptor (SCART) 				

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### 1. Camera Light

The camera light is turned on or off depending on the position of the LIGHT switch.

**NOTE:** The camera light turns on only in the record and record pause modes.

### 2. Microphone

Sensitive to sounds coming from the direction in which the camera is pointed.

### 3. REVIEW Button

Used to review the last few seconds of the recorded segment in the record/pause mode.

### 4. DISPLAY Button

Pressing this button turns the memory feature on and off. "M" appears in the viewfinder when this feature is turned on. Also this indication appears on the TV screen.

### 5. RESET Button

Pressing this button resets the counter to "0:00:00"

### 6. DATE/TIME Button

Press this button to display the date and time in the viewfinder. Whenever the date and time appear in the viewfinder, they will be recorded on the tape.

### 7. TITLE Button

Press this button to create and record personalized titles on your videos with the camera/recorder's built-in titler. See page 23.

### 8. OPERATE Switch (CAM/OFF/VIDEO)

This switch changes the camera/recorder to the record mode or to the playback mode.

Press and hold the small button on this switch, then slide it to "CAM" or "VIDEO".

### 9. AUDIO/VIDEO DUBBING Mode Select Button

This button is used to record new audio in place of existing audio without erasing the video signal or to record new video and audio while erasing the previous audio and video signals.

### 10. REW Button

Press this button during stop or fast forward mode, and fast-rewinding starts. Press the button during playback of tape, and the tape is played back in the rewind direction approximately 3 times faster than the normal speed to confirm the recorded contents. Press PLAY button to return to normal playback mode or press STOP/EJECT button to stop tape movement.

**NOTE:** You can also visually scan backward when the camera/recorder is in record/pause (stand-by) mode by pressing and holding this button.

### 11. PLAY Button

Used for playback of tape recorded in the SP mode.

**NOTE:** When the camera/recorder is in record/pause (stand-by) mode, pressing and holding this button will play the tape at normal.

## 12. F.FWD Button

Press this button during stop or rewind mode, and fast-forwarding starts. Press the button during playback of tape, and the tape is played back in the forward direction approximately 3 times faster than the normal speed to confirm the recorded content. Press PLAY button to return to normal playback mode or press STOP/EJECT button to stop tape movement.

**NOTE:** You can also visually scan forward when the camera/recorder is in record/pause (stand-by) mode by pressing and holding this button.

## 13. STOP/EJECT Button

The STOP/EJECT button is used to stop playback, rewind, and fast forward operations. The STOP/EJECT button has no effect during record operation. Press the button in the stop mode to insert or remove the cassette.

## 14. OPERATE Indicator

## 15. Diopter Control (on the side of the viewfinder)

To use the electronic viewfinder without eyeglasses on, turn this control for your optimum focus adjustment.

## 16. MIC Jack (under the built-in microphone)

Connect an external microphone (not supplied) here to record sound from the external microphone.

**NOTE:** Connecting an external microphone automatically switches off the built-in microphone.

## 17. AUDIO/VIDEO/RF DC OUT Jacks (behind the cover)

Connect the supplied audio/video cables or the optional RF converter unit to view a playback picture on a TV.

## 18. SHUTTER Button

Used to control the shutter speed during recording and/or record/pause (stand-by) mode.

## 19. Camera Light Switch

This switch is used to turn the built-in camera light on and off. When the switch is in the AUTO position, the camera light turns on automatically if the lighting in the area around the subject is insufficient for a clear picture.

## 20. FADE Button

During recording you can add a professional touch to your recordings by fading in and out of scenes.

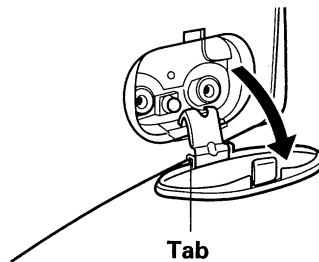
## 21. Lens

F1.8 (5~60 mm) 12:1 power zoom lens features with auto focus and auto iris functions.

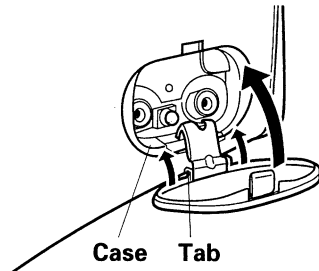
## 22. Focus Control Buttons (AUTO/MAN ◀ FOCUS ▶)

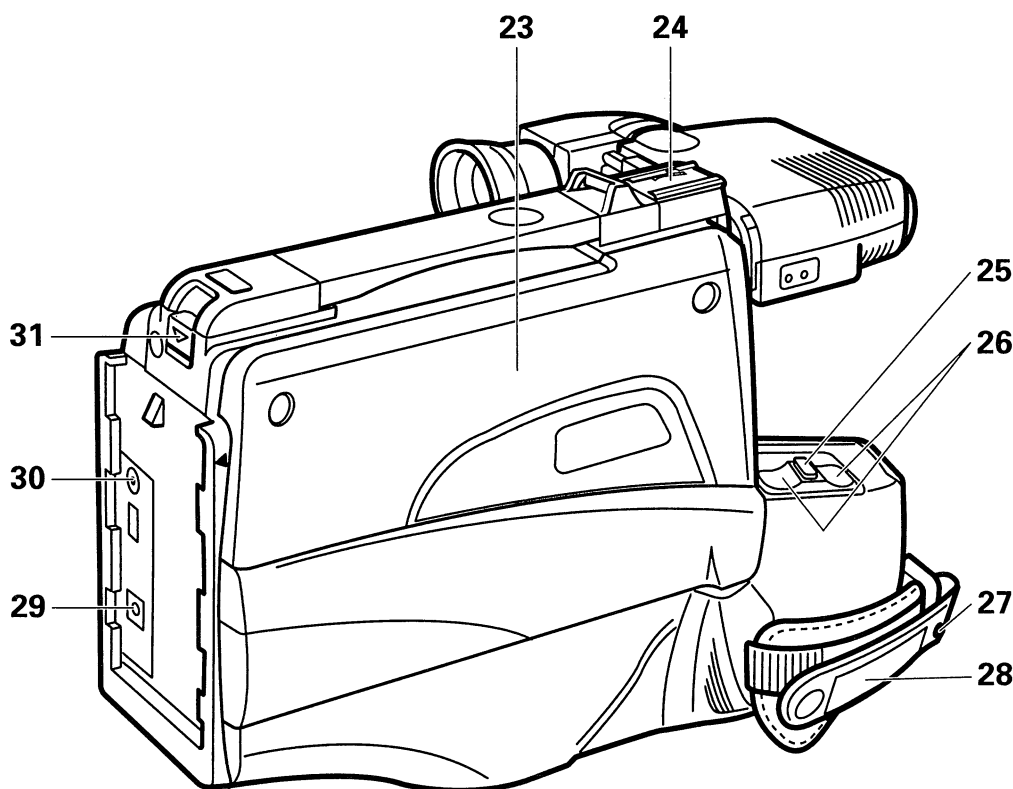
Press these buttons simultaneously to select manual or automatic focus. "FOCUS" appears in the viewfinder when you select the manual focus mode by pressing both buttons simultaneously. For manual focusing, press the ◀ or ▶ button to bring the subject into focus.

### ■ To open the cover:



### ■ To close the cover, first hook the tab onto the case.





### 23. Cassette Holder

Press STOP/EJECT button in the stop mode to open the cassette holder. Be aware of the cassette direction when inserting.

**NOTE:** Power source must be connected to open the cassette holder.

### 24. Accessory Shoe

Used to attach an optional video accessory.

### 25. REC/PAUSE Button

When this button is pressed during recording, the tape stops and the camera/recorder enters the record/pause (stand-by) mode. When this button is pressed again, the tape runs to resume recording. This button may be also used to display a still picture during playback mode.

### 26. Power Zoom Switch/TRACKING Control

This switch performs zooming electrically.

"W": Picture becomes wider gradually.

"T": Picture becomes telescopic gradually.

This switch is used as a tracking control during tape playback to adjust for the optimum picture.

### 27. Lens Cap Tab

Place the lens cap on this tab when you are ready to record a scene. The tab also prevents the lens cap from swinging around on its cord.

### 28. Hand Strap

Adjust to best fit to your hand.

### 29. DC IN 9.6V Jack

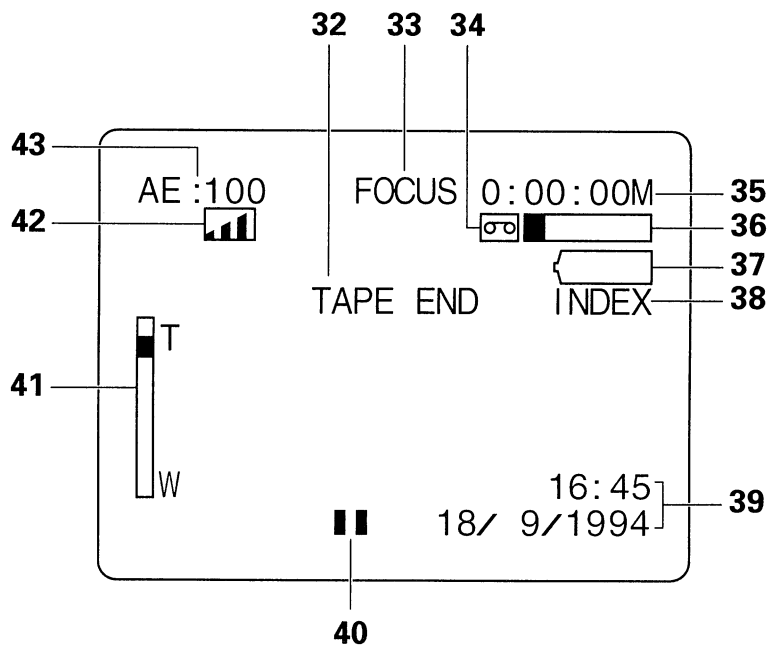
When using the AC adaptor/charger, connect one end of the DC cord (provided) to this jack and the other end to "DC OUTPUT" of the AC adaptor/charger. When using the car cord (optional), connect this jack and the car's cigarette lighter socket.

### 30. S.EDIT Jack

For synchro editing, connect the optional synchro edit cord here.

### 31. BATTERY Eject Lever

Release the battery attached to the video camera/recorder.



### 32. TAPE Indicator

When the record start/stop button is pressed, if a cassette without its safety tab is inserted, "TAPE" appears for several seconds.

When the record start/stop button is pressed, if no cassette is inserted, "NO TAPE" appears for several seconds.

When the tape reaches near the end during shooting, "TAPE END" flashes.

### 33. FOCUS Indicator

This indicator shows when the camera/recorder is set to the manual focusing mode. It lights when the AUTO/MAN FOCUS control buttons are pressed simultaneously.

### 34. Cassette-in Indicator

Lights when a cassette has been loaded in the camera/recorder.

### 35. Linear Time Counter

Shows the tape consumption in hours, minutes and seconds.

### 36. Time Remaining Indicator

Shows remaining tape in seven steps.

### 37. Battery Indicator

Indicates the battery condition.

### 38. INDEX Indicator

See page 20 for details.

### 39. Date/Time Indicator

Indicate the date/clock during the record or record/pause (stand-by) mode. You can record the clock and/or date with object when recording.

### 40. Mode Indicator

Indicates the operating modes;

- "REC" appears during the record mode.
- "◀◀" appears during the rewind mode.
- "▶▶" appears during the fast forward mode.
- "II" appears during the record/pause (stand-by) mode.

### 41. Zooming Range Indicator

Shows the rough zooming range for a few seconds when the zoom switch is pressed.

### 42. Fade Mode Indicator

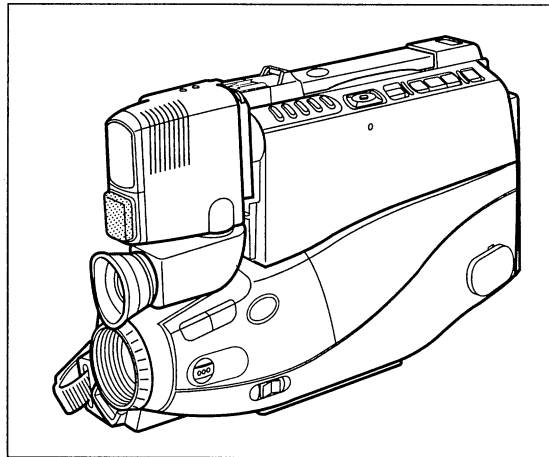
Shows the selected fade mode when fading in and out.

### 43. Shutter Speed Indicator

Indicates the selected shutter speed.

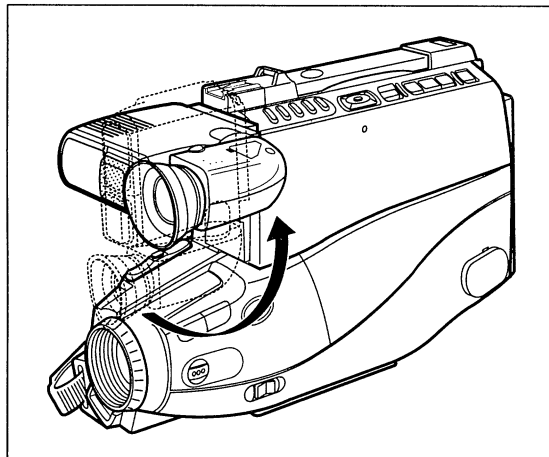
## ELECTRONIC VIEWFINDER (EVF)

- Set the viewfinder to the position shown in the figure when carrying the camera/recorder or storing it in a carrying case.

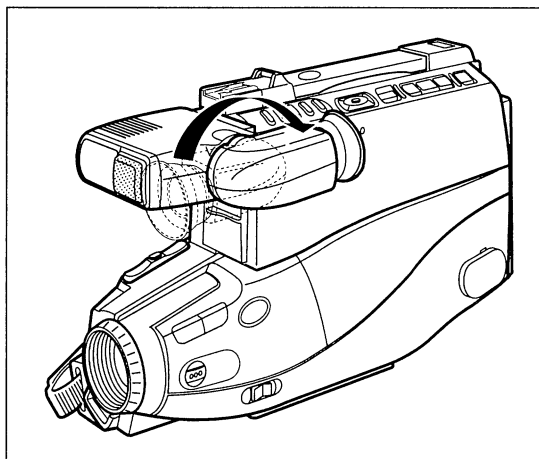


- Turn the viewfinder to the position shown below when recording pictures.

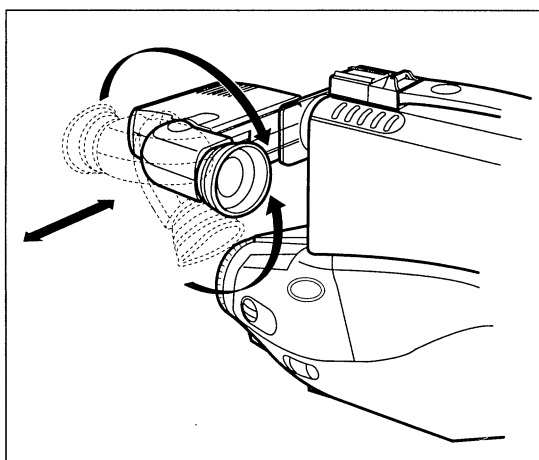
1. Turn the viewfinder.



2. Turn the eyepiece.

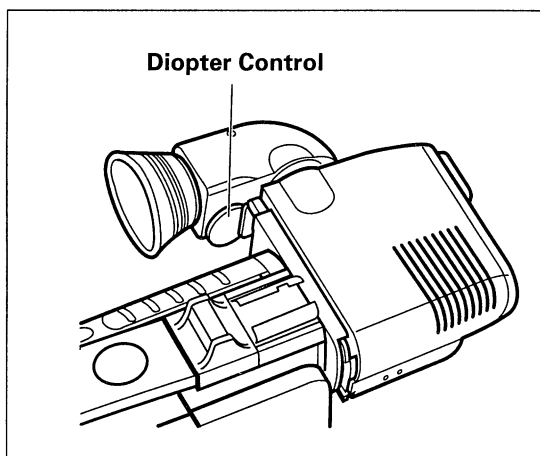


- You can adjust the position and angle of the viewfinder so you can see the picture most clearly.



## EYEPiece ADJUSTMENT

To use the electronic viewfinder without eye-glasses on, adjust the diopter control for optimum focus adjustment.

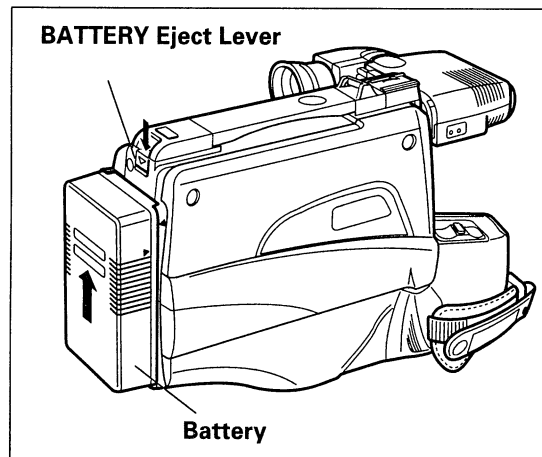
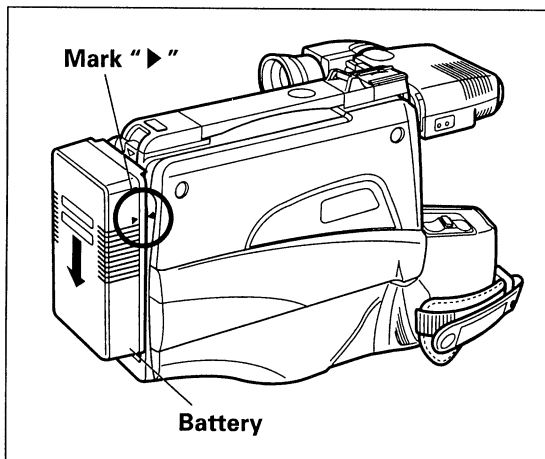




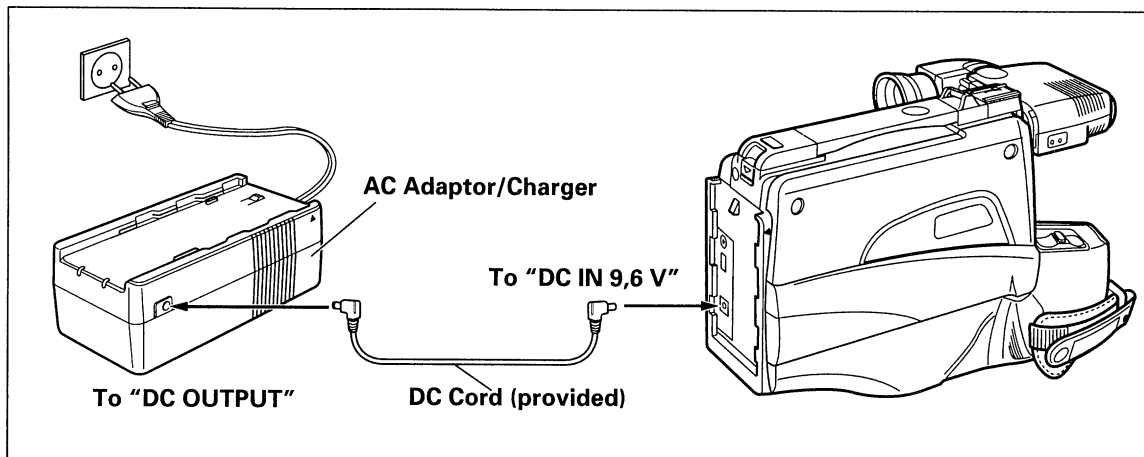
## POWER SOURCES

### ■ WHEN USING WITH THE BATTERY

- To attach, align the mark "▶" on the battery with that of the camera/recorder so that the battery fits into the grooves, and slide the battery downward, as illustrated.
- To remove, slide the battery upward while pressing the BATTERY eject lever in the direction of the arrow.



### ■ WHEN USING WITH THE AC ADAPTOR/CHARGER (VM-AC67E)

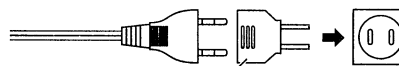


1. Plug the AC adaptor/charger power cord into AC electrical outlet; the POWER indicator on the AC adaptor/charger will come on.
2. Connect one end of the DC cord (provided) to the "DC IN 9.6V" jack of the camera/recorder. Connect the other end of the DC cord to the "DC OUTPUT" of the AC adaptor/charger.

See the bottom of the AC adaptor/charger. The rating label is located on the bottom of the AC adaptor/charger.

#### NOTES:

- This AC adaptor/charger is universal for use with AC 100 — 240V around the world. If you use the camera/recorder in some foreign countries, an AC plug adaptor (not supplied) may be necessary.

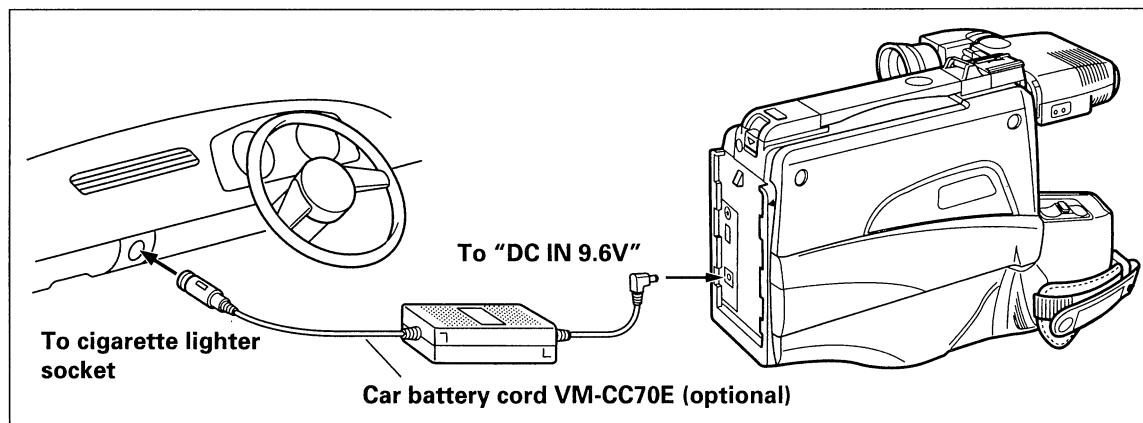


AC Plug Adaptor  
(not supplied)

- When using the AC adaptor/charger to power the camera/recorder, the battery level indicator may display "■". This indicator is used for battery operation and has no meaning when using the AC adaptor/charger to power the camera/recorder.

## POWER SOURCES (Cont'd)

### ■ WHEN USING WITH THE CAR BATTERY (By using optional car battery cord Hitachi VM-CC70E)



1. Connect the small plug of the car battery cord to the "DC IN 9.6V" jack of the camera/recorder.
2. Connect the other end of the car battery cord to the car's cigarette lighter socket.

#### NOTES:

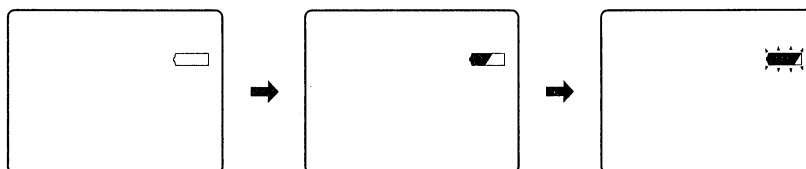
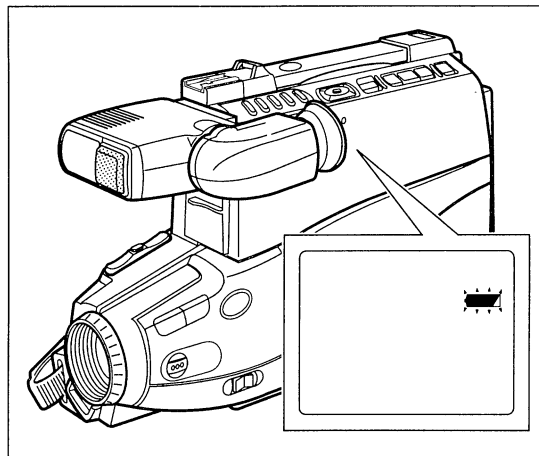
- The car battery cord is designed to be used only with automobiles having a 12-volt negative ground system.
- To avoid possible damage to your camera/recorder, make sure the car cord you plan to use has positive tip polarity and is capable of converting 12 volts to 9.6 volts such as Hitachi model VM-CC70E.

**NOTE:** Be sure to turn off power of the camera/recorder when attaching or detaching a power supply (battery, AC adaptor/charger, etc.) to the camera/recorder.

## CHECKING THE BATTERY PACK

When the "■" indication in the electronic viewfinder appears and flashes while the video camera/recorder is operated with a battery pack, it indicates that the battery charge is insufficient. Charge it or replace it with a charged battery pack.

**NOTE:** Whenever the linear time counter or time remaining display is present in the viewfinder, the battery level indicator "□" is displayed in the viewfinder indicating the condition of camera/recorder battery power. When the battery is fully charged, "□" is displayed. After several minutes, the symbol will change to "■". When the battery is very near empty, the symbol will change to "■" and start blinking. You should find an alternative power source or recharge the battery before continuing to use your camera/recorder.

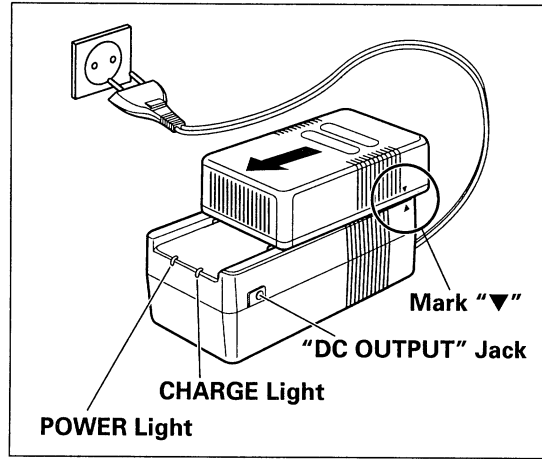


## CHARGING THE BATTERY PACK

1. Plug the AC adaptor/charger power cord into AC electrical outlet.
2. Attach the battery to the AC adaptor/charger. Align the mark "▼" on the battery with that of AC adaptor/charger and push the battery flush with the AC adaptor/charger and slide it in the direction of arrow.

**NOTE:** You must remove the DC cord from the AC adaptor/charger to charge the battery. If the DC cord is connected, CHARGE light will not light.

3. The CHARGE light will be lit while the battery is accepting a charge, and will go out when the battery is fully charged.



### NOTES:

1. The time required for charging the battery is approx. two hours for VM-BP66 and three hours for VM-BP67.
2. When fully charged, the battery should supply approx. 90 — 120 minutes of operating time for VM-BP67 (45 — 60 minutes for VM-BP66) (depending on how much you use zoom and pause).
3. Charge the battery after use and store it at normal room temperature.
4. Recharge your battery at least once every six months. The battery is a lead-acid battery. This battery tends to discharge if not used for an extended period of time. If the battery is stored for an extended length of time without being recharged, you may not be able to recharge it.
5. A battery charged after being stored for a long period may not supply power for the specified time. Additional rechargings will help restore the battery's operation time.
6. The battery should be charged at a temperature of 10°C — 30°C to prevent damage.
7. Do not operate the battery at temperatures below -10°C or above 35°C. The battery may be damaged if operated at temperatures above 50°C. Operation time will decrease at extremely low temperatures.
8. After repeated chargings and use, the operation time will gradually decrease. When operation time becomes too short to be useful, it is time to replace the battery.
9. If CHARGE and POWER lights on the AC adaptor/charger start flashing, remove the battery and then reattach it. If after several attempts both lights continue to flash, this means your battery cannot take a charge and must be replaced with a new one. The CHARGE light will not light if a hot battery is attached to the AC adaptor/charger. Attaching an extremely hot battery to the AC adaptor/charger is not recommended; it should be allowed to cool down before being attached.
10. Do not short the battery's terminal.
11. Do not attempt to disassemble or modify the battery. There are no user serviceable parts inside.
12. Throwing the battery into a fire or exposing the battery to excessive heat — over 65°C could be hazardous.

## INSERTION AND REMOVAL OF CASSETTE

Before inserting or removing a cassette, be sure to connect the power source. When a power source is connected, the cassette can be ejected and removed whether the power is on or off.

### ■ Insertion

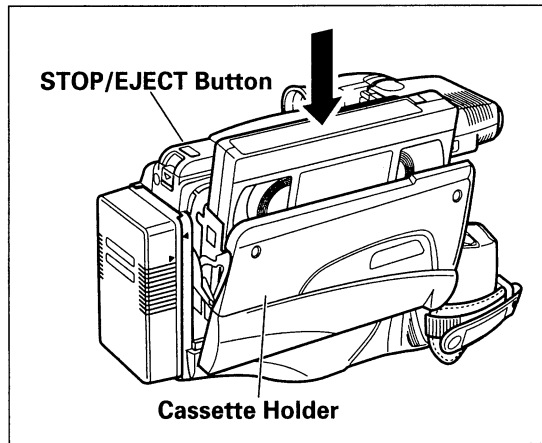
1. Press the STOP/EJECT button in the stop mode and insert the cassette so the transparent window is toward you and the arrow toward the cassette holder. Slide the cassette into cassette holder as far as it will go.

#### NOTES:

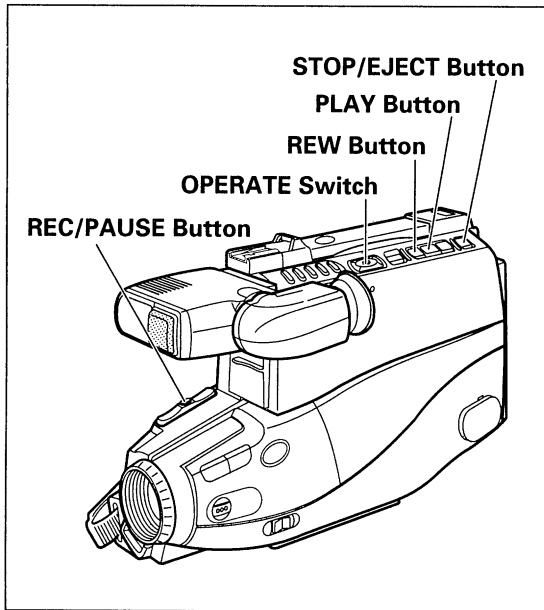
- If the power source is not connected to camera/recorder, the cassette holder will not open.
  - Push in the center of the cassette all the way until it is latched by the cassette holder.
2. Press the cassette holder. The holder will latch in the operating position.

### ■ Removal

Press the STOP/EJECT button in the stop mode and remove the cassette.



## CAMERA RECORDING



1. Connect either one of the "POWER SOURCES" on pages 9 and 10.

2. Insert the cassette so the transparent window is toward you and the arrow toward the cassette holder.

3. Press and hold the small button on the OPERATE switch, and then slide it to the "CAM" position.

The OPERATE indicator will light and the camera/recorder will enter record/pause mode automatically.

**NOTE:** If the erase prevention tab on the cassette is removed, the "TAPE" indication in the viewfinder flashes for several seconds and the camera/recorder will not enter record/pause mode.

4. Now, press the REC/PAUSE button on the handgrip to start shooting the picture. You are now recording the picture you see through the electronic viewfinder. The "REC" indication in the electronic viewfinder will appear.

5. Press the REC/ PAUSE button to stop recording. Press the button again to resume recording. The "REC" indication in the electronic viewfinder goes off in the record/pause (stand-by) mode.

**NOTE:** The "TAPE END" indication in the viewfinder starts flashing when there is about 5 minutes recording time left on the cassette.

6. After recording, press and hold the small button on the OPERATE switch, and then slide it to "VIDEO". The camera/recorder will be now in the stop mode.

7. Press REW button. The tape will be rewound to the beginning.

8. Press PLAY button. The picture you just recorded will be seen through the viewfinder.

**NOTE:** If you connect the camera/recorder to your TV, you can see the picture played back on your TV. Refer to "CONNECTIONS AND OPERATIONS FOR VIEWING THE PICTURE PLAYED BACK ON YOUR TV" on page 27.

9. After playing, press the STOP/EJECT button.

10. Slide the OPERATE switch to "OFF" position to turn off the camera/recorder.

Press the STOP/EJECT button to remove cassette.

11. Always remove the power source from the video camera/recorder after use.

**NOTE:** If you have a cassette tape that has already been partially recorded on and you want to record the remaining blank section, see "QUICK EDIT" on page 16.

## AUTO FOCUS

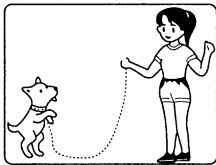
The camera/recorder focuses on the subject in the centre of the viewfinder automatically unless the manual focus is engaged.

### The range of object with which auto focus can be used

- On "T" side: about 1.1m from the lens surface to infinity.
- On "W" side: about 3 cm from the lens surface to infinity.

The auto focus feature always turns on when the OPERATE switch is moved to the CAM position. (When the camera/recorder is in the manual focusing mode, the FOCUS indicator lights in the viewfinder. See the next page for details.)

### ■ Auto focus will not work under the following conditions.



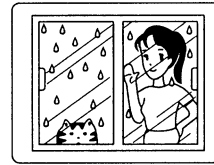
1. Objects not in the center of the viewfinder.



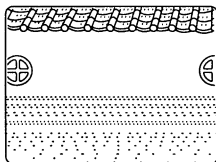
2. Objects at far and near positions at the same time.



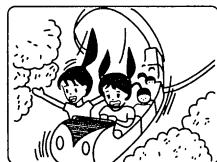
3. Objects lit by a spotlight or neon signs, etc.



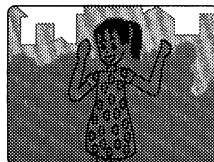
4. Objects behind glass with water droplets or dust on it.



5. Objects with almost no difference in brightness such as a white wall.



6. Objects moving rapidly.



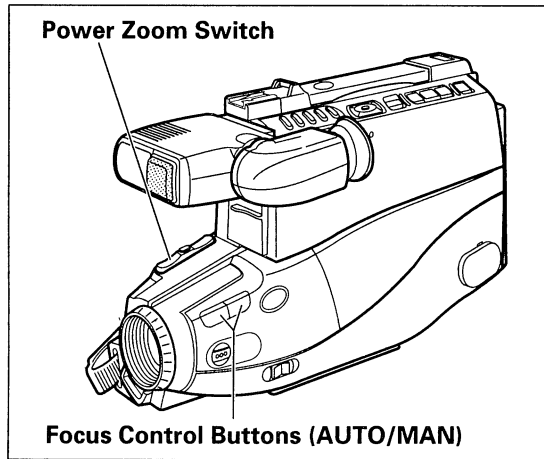
7. Dark objects.

## ■ MANUAL FOCUSING

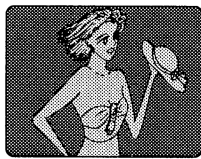
1. Press the two FOCUS control buttons (AUTO/MAN) simultaneously; the FOCUS indicator will light. "FOCUS" appears to show that the camera/recorder is in the manual focusing mode.
2. Zoom in on the object by pressing the power zoom switch on the "T" side.
3. Focus on the subject by pressing the FOCUS control button ◀ or ▶.

**NOTE:** If focusing is performed without zooming up first, the picture may become out of focus when the zoom-up is done during actual picture taking.

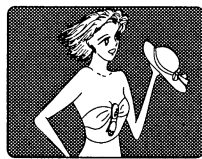
4. Then, zoom back the object as desired.



Far object



Zoom up



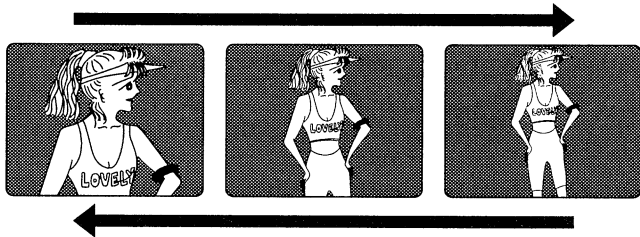
Focused



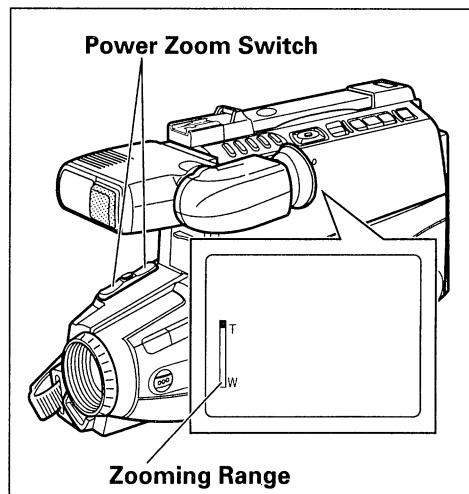
Zoom back

## POWER ZOOM

- Press power zoom switch on the "W" side, and the picture gradually widens.

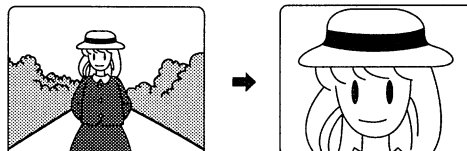


- Press power zoom switch on the "T" side, and the picture gradually becomes telescopic.
- The zooming speed is slow when the power zoom switch is pressed lightly, and the zooming speed is faster when the switch is pressed more firmly.
- When the power zoom switch is operated, the zooming range is displayed in the viewfinder for about 5 seconds and then disappears. The zooming range is displayed in 10 steps.



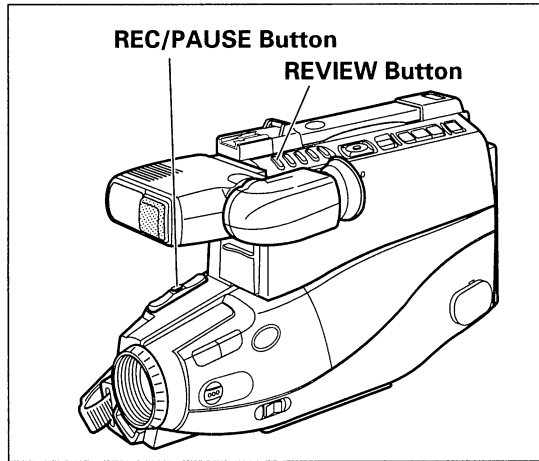
## ■ Super zoom (Telemacro) feature

Auto focus operates even when you bring the camera/recorder up to 110 cm from a subject, therefore, you can zoom up so the subject fills the screen and record it.



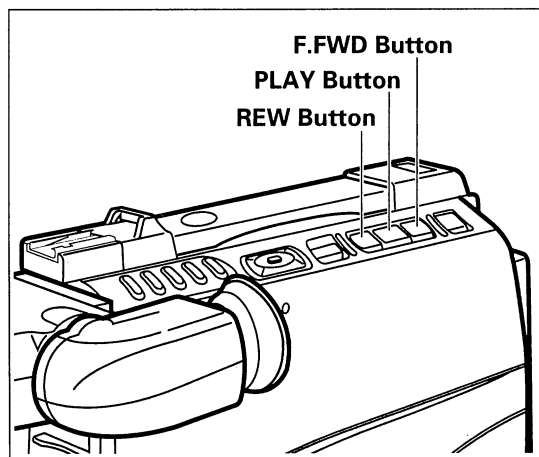
## INSTANT REVIEW

1. In record/pause (stand by) mode, press REVIEW button, and the recorded scene of the last few seconds is played back in the reverse direction and then played back in the forward direction.
2. When the tape reaches the end of the scene you have just recorded, the camera/recorder returns to the record/pause (stand by) mode. Recording starts again when the REC/PAUSE button is pressed again.



## QUICK EDIT

The quick edit feature allows you to search for the end of previously recorded material, or find a particular spot on your tape, to begin your editing, or recording new material. Quick edit is used while the camera/recorder is in the record/pause (stand-by) mode. By holding down the F.FWD, REW, or PLAY button you can visually search or play your tape. Releasing the buttons (F.FWD, REW, or PLAY) immediately stops the tape at that position.





## SHUTTER SPEED CONTROL

Use this feature to shoot tennis and golf shots that contain rapid movement. You can replay the still pictures at the crucial moments.

Normally the programme AE feature operates and selects the optimum shutter speed, 1/50, 1/60, 1/100, 1/120, 1/150, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000, 1/4000 or 1/10,000, according to the brightness of the subject. To increase the shutter speed, follow the procedure below.

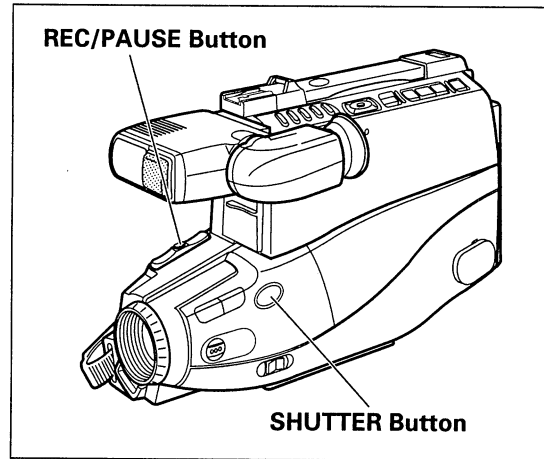
1. Press the SHUTTER button until the desired speed appears in the viewfinder. The speed changes from AE mode to 1/50, 1/100, 1/250, 1/1000, 1/2000, 1/10,000 and back to AE mode each time the button is pressed.

For example, the speed is 1/1000 seconds, "S:1000" will be displayed in the viewfinder.

2. Press the REC/PAUSE button to start recording.

### NOTES:


- After use, press the SHUTTER button repeatedly to return to the AE mode.
- The faster the shutter speed, the darker the picture. For better picture, decrease the shutter speed or raise the camera light to illuminate the subject.
- When a tape that was recorded using the high speed shutter feature is played back, scenes changes will not be seen as a smooth motion.
- When the camera is pointed at an object that is moving rapidly, it may not focus properly in the auto focus mode. In this case, focus manually.
- When recording under the illumination of fluorescent lamp, a mercury vapor lamp or a sodium lamp, flickering may occur.



## FADE-IN/FADE-OUT


Use the fade feature to add a professional touch to your recordings. Use the FADE button to select one of the two fade options.

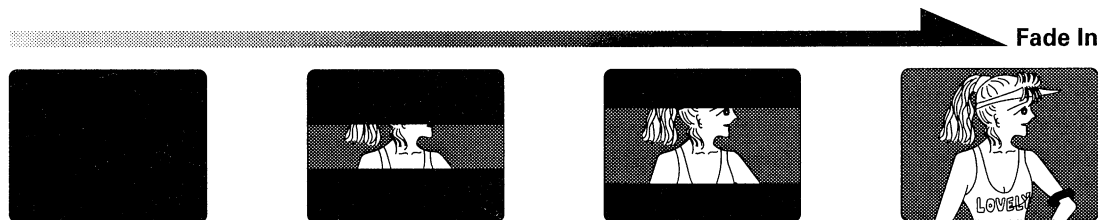
**NOTE:** When you fade scenes in and out, the sound will also fade in and out with the picture.

- White fade: Fades in from a white screen or fades out to a white screen. "  " appears in the upper left corner of the viewfinder.



Fade Out

- Wipe fade: The picture opens gradually from the centre of a black screen or closes into the centre to a black screen. "  " appears in the upper left corner of the viewfinder.



Fade Out

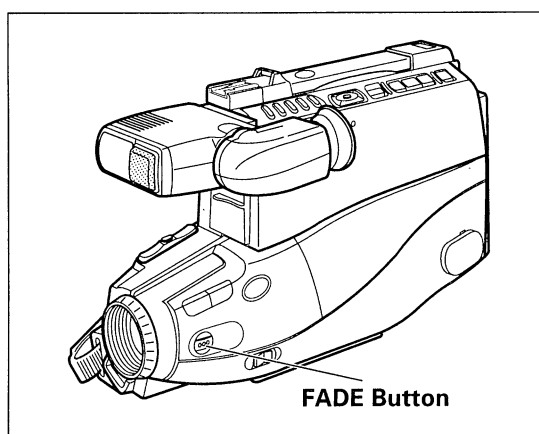
### Fading In

1. Use the FADE button to select the required fade option before recording.
2. Press the REC/PAUSE button to start recording; the picture fades in automatically.

### Fading Out

1. While recording with the camera/recorder use the FADE button to select the required fade option.
2. Press the REC/PAUSE button to stop recording; the picture fades out automatically and "REC" flashes until the fade ends.

**NOTE:** When fading out be sure to wait until the pause indicator "II" appears in the viewfinder before attempting to set the camera/recorder to the record mode again.



## **AUTOMATIC REWIND**

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When the tape reaches the end during playback, the tape will stop and automatically rewind to the beginning.

## **FLYING ERASE HEAD**

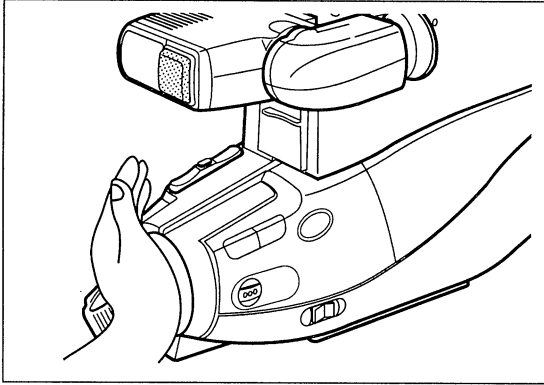
---

A rotating erase head which eliminates glitches and rainbow noise that occurs at the joints between recorded segments.

## **ATTACHING THE TELE OR WIDE CONVERTER**

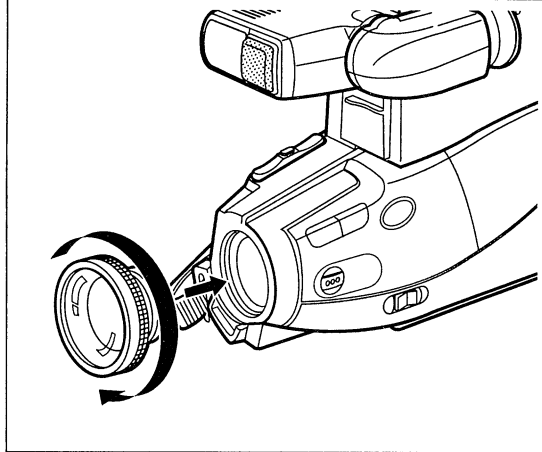
---

1. To remove the lens hood, turn it counterclockwise as shown in the figure.



2. Remove both caps of the telephoto or wide angle lens.

3. Screw the lens into the threads on the front of camera/recorder lens assembly.



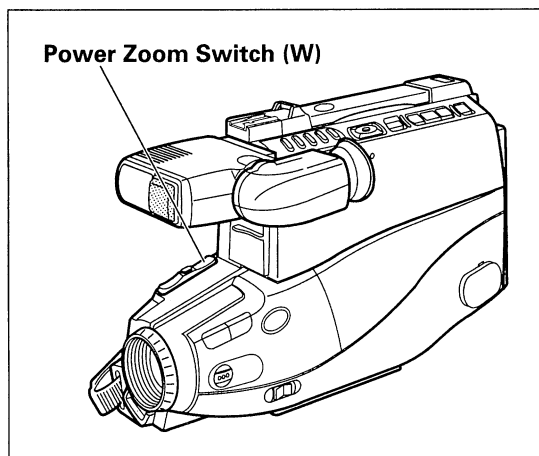
## MACRO

It permits you to shoot objects as close as 3 cm from the lens tip.

Press and hold "W" side of power zoom switch. An object is auto focused.

### NOTE:

- Determine the size of the object by moving the camera backward and forward.
- Be careful as the lighting tends to be low when shooting in the above conditions.



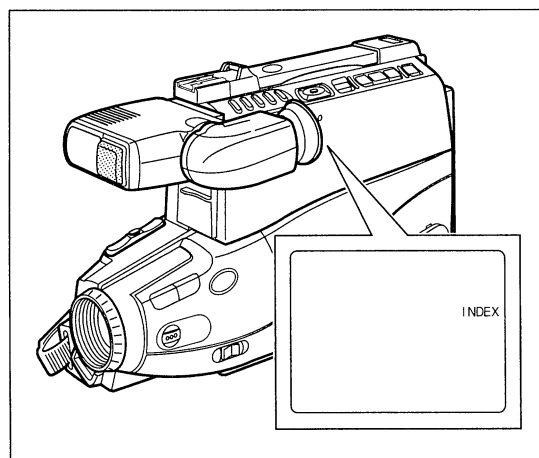
## INDEX SIGNAL RECORDING

Indexing your tapes while recording makes it easy to find desired programme segments when you later play back the tape in a VCR that has a compatible indexing feature called the "VHS Index Search System". See your VCR's instruction manual for index playback instruction.

INDEX signals are recorded when the following operations are performed.

- When power is turned on about 4 hours after it is switched off and then recording is started.
- When power is turned on after the date is changed to the next day with the power off and then recording is started.

**NOTE:** "INDEX" is displayed in the viewfinder, and when an INDEX signal is recorded, "INDEX" disappears.



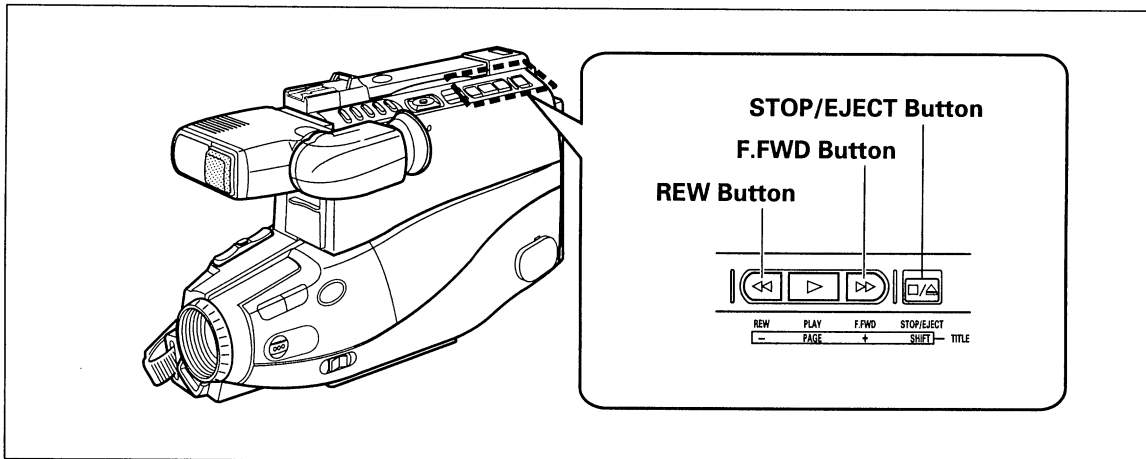
## DATE/TIME SETTING

The date and time can be recorded on your tapes to act as a handy reference when viewing them at a later time.

**NOTE:** A back-up battery for the date/time function is built into the camera/recorder. This battery is rechargeable and should be charged every two months. Charge the back-up battery by the following procedure.

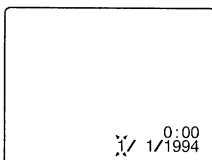
1. Set the OPERATE switch to the "OFF" position.
2. Connect a power source (charged battery or AC adaptor/charger) to the camera/recorder and maintain this state for about 24 hours.

Use the following procedure to set up this display for the current date and time.

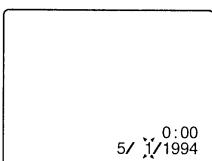


### To set the clock

1. Press and hold the small button on OPERATE switch, and then slide it to "CAM" position. The OPERATE indicator will light.
2. Press DATE/TIME button. "0:00" and "1/1/1994" appears in the viewfinder and "1" flashes.

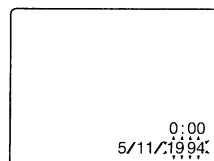


3. Press F.FWD button to select correct date. Hold button down to advance rapidly. If you go past the date you want to set, press REW button. When the correct date appears, press STOP/EJECT button.

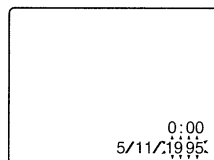


4. Press F.FWD button to select correct month. Hold button down to advance rapidly. If you go past the month you want to set, press REW button. When the correct month appears, press STOP/EJECT button.

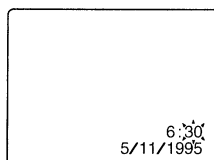
5. Press F.FWD or REW button to select year, and then press STOP/EJECT button.



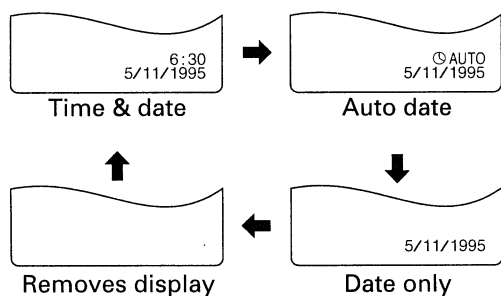
6. Press F.FWD or REW button to select correct hour, and then press STOP/EJECT button.
7. Press F.FWD or REW button to select correct minute.



8. After setting correct minute, press DATE/TIME button to start the internal clock.



9. Press DATE/TIME button after setting the clock. The display will change as follows each time the button is pressed.



**NOTE:** The date/time graphics will be recorded whenever they appear in the viewfinder.

#### To record the date/time

The date and time will be recorded whenever they appear in the viewfinder. Select the desired display by pressing the DATE/TIME button and then start recording.

#### ■ Automatic date recording

This feature records the date automatically once a day. After you begin recording, the date is recorded automatically for 10 seconds. The same date is recorded again in the following cases.

- When the cassette is replaced
- When "⌚ AUTO" is displayed again after being switched to the date display
- When the recording is for less than 10 seconds

If the date changes while recording continues over 10 seconds, the date is recorded for 10 seconds when recording is restarted after the camera/recorder has been set to the standby mode.

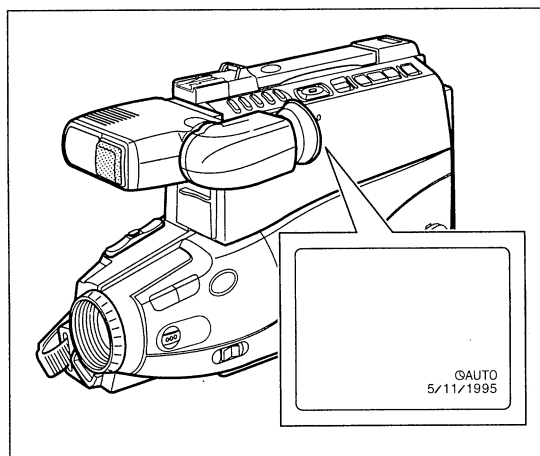
Press the DATE/TIME button until "⌚ AUTO" and the date appear in the viewfinder before you begin to record. The date will be recorded whenever it appears in the viewfinder.

#### ■ To correct date/time after starting the date/time

1. Press and hold DATE/TIME button, and then press STOP/EJECT button. The date starts flashing.
2. Correct the incorrect digit by using F.FWD, REW and STOP/EJECT buttons.

#### ■ To correct date/time during programming

1. Press STOP/EJECT button repeatedly until the digit that is incorrect flashes.
2. Correct the incorrect digit by using F.FWD, REW and STOP/EJECT buttons.

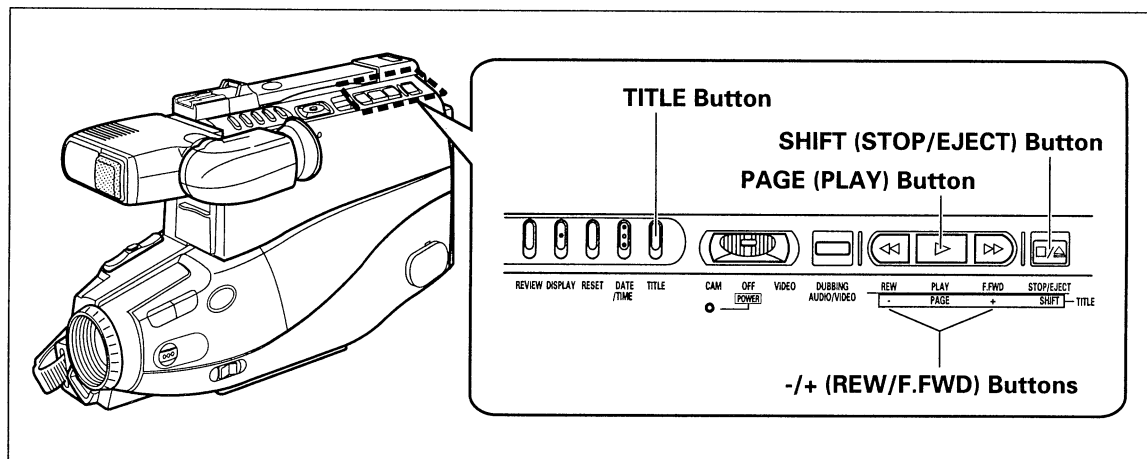


## TITLE RECORDING

You can easily create and record personalized titles on your videos with the camera/recorder's built-in titler.

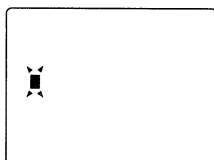
The titler will store 2 different title pages in memory. Once a title is stored, it can be displayed and recorded at anytime. Each title page can contain two lines of 16 characters each.

The character contains 47 different characters for creating titles.



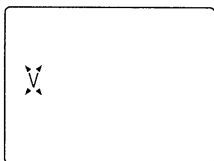
### ■ Creating a title

1. Attach a power source to the camera/recorder and slide the OPERATE switch to either "CAM" or "VIDEO".
2. Press TITLE button. The flashing cursor will appear in the viewfinder.

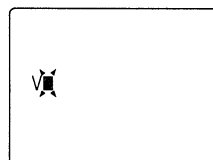


3. Press SHIFT button repeatedly to move the flashing cursor to the place you want to begin your title.
4. Select the first character for your title by pressing the (-) or (+) button repeatedly until the desired character appears.

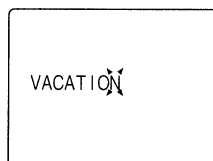
**NOTE:** Each title can contain up to two lines of 16 characters each. A chart showing the characters contained in the registers is located on page 24.



5. After you have selected the first character, press SHIFT button to move the flashing cursor to the place you want the next character.



6. Repeat steps 4 and 5 until you have completed the title.



**NOTE:** Character may flash, however it will be recorded correctly without flashing.

7. After completing your title, press PAGE button and create the title on another title page.
8. After creating the title, press TITLE button to remove the title graphics from the viewfinder. Now title graphics is stored in memory.

### ■ Correcting errors during programming

1. Press SHIFT button repeatedly until the character to be corrected flashes.
2. Press either “-” or “+” button until the correct character appears.

**NOTE:** The corrected character may flash, however it will be recorded correctly without flashing.

### ■ Recording titles on a tape in the camera/recorder

1. Slide the OPERATE switch to “VIDEO”.
  2. Locate the position on the tape that you wish to record the title.
  3. Set OPERATE switch to “CAM”.
  4. Press TITLE button to display the title graphics.
  5. Press PAGE button until the title you wish to record appears in the viewfinder.
  6. Press the REC/PAUSE button to start the title recording.
  7. Press TITLE button to remove the title graphics from the viewfinder.
- The camera/recorder will now record as normal.

### ■ Recording titles on another VCR while playing a tape back with the camera/recorder

1. Connect the camera/recorder and VCR.  
(See page 31.)
2. Select the title you wish to record from page 1 or page 2. The last title selected will appear first. Press TITLE button to turn title off.
3. Set the VCR in the recording mode and camera/recorder in the playback mode.
4. Press TITLE button when you see the scene where you want to record the title.
5. Press TITLE button to erase the display from the viewfinder.

### ■ Chart of characters available by using the CHARACTER control

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	0	1	2	3	4	5	6	7	8	9
?	'	.	/	,	-	;	:	<	>	!							



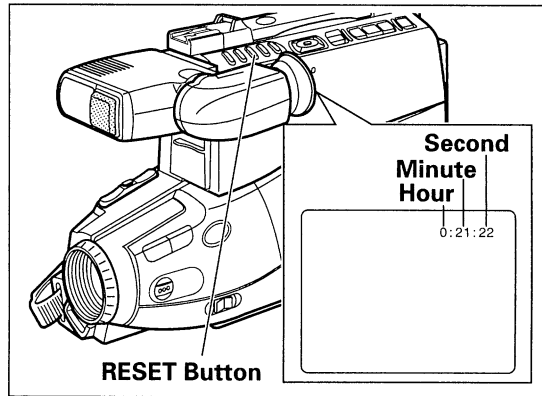
## LINEAR TIME COUNTER

Shows length of tape run in hours, minutes and seconds.

Load a cassette into the camera/recorder and perform recording or playback; the counter indicates the elapsed time.

### NOTES:

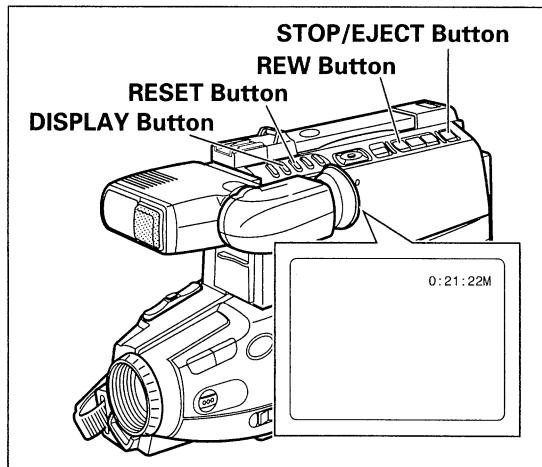
- The linear time counter does not operate when nothing is recorded on the tape.
- Counter changes to "0:00:00" when cassette is ejected.
- Pressing the RESET button resets the tape counter to "0:00:00".



## MEMORY

When the linear time counter with memory indication appears in the viewfinder, a tape that is being rewound automatically stops when the counter reads approximately "0:00:00M". This is useful if there is a section of tape you want to review immediately after recording or if you want to return to the same point several times in a row.

1. Press DISPLAY button, and the "M" appears in the viewfinder.
2. Start playing or recording a tape.
3. At the point you want playback to start, press RESET button to reset the counter to "0:00:00M".
4. Continue to play or record.
5. Press the STOP/EJECT button to stop playback, or press the REC/PAUSE button to stop recording and set the OPERATE switch to "VIDEO".
6. Press REW button. The tape will be rewound to the preselected point, at approximately "0:00:00M" indication.



**NOTE:** The tape will also stop approximately at "0:00:00M" during fast forward mode.

## REMAINING TAPE

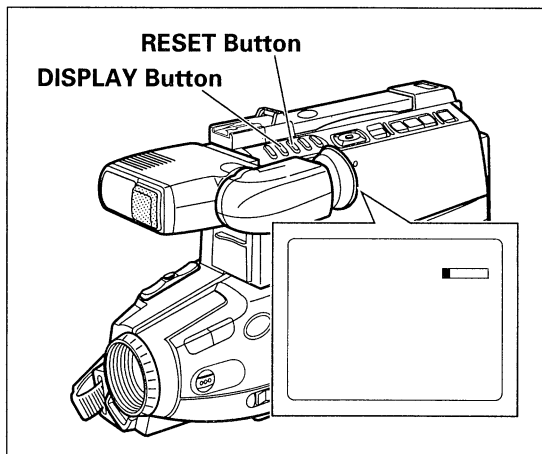
The tape remaining graphic display shows the remaining tape that can be used for recording and playback. This feature is handy when recording since it lets you know how long you can record on the current tape.

Insert a cassette and start recording or playback; approx. 15 seconds later the remaining tape graphic display will appear.

"[REMAINING TAPE GRAPHIC] -----" is displayed until the remaining graphic display appears.

The remaining tape graphic display will disappear when the cassette is ejected.

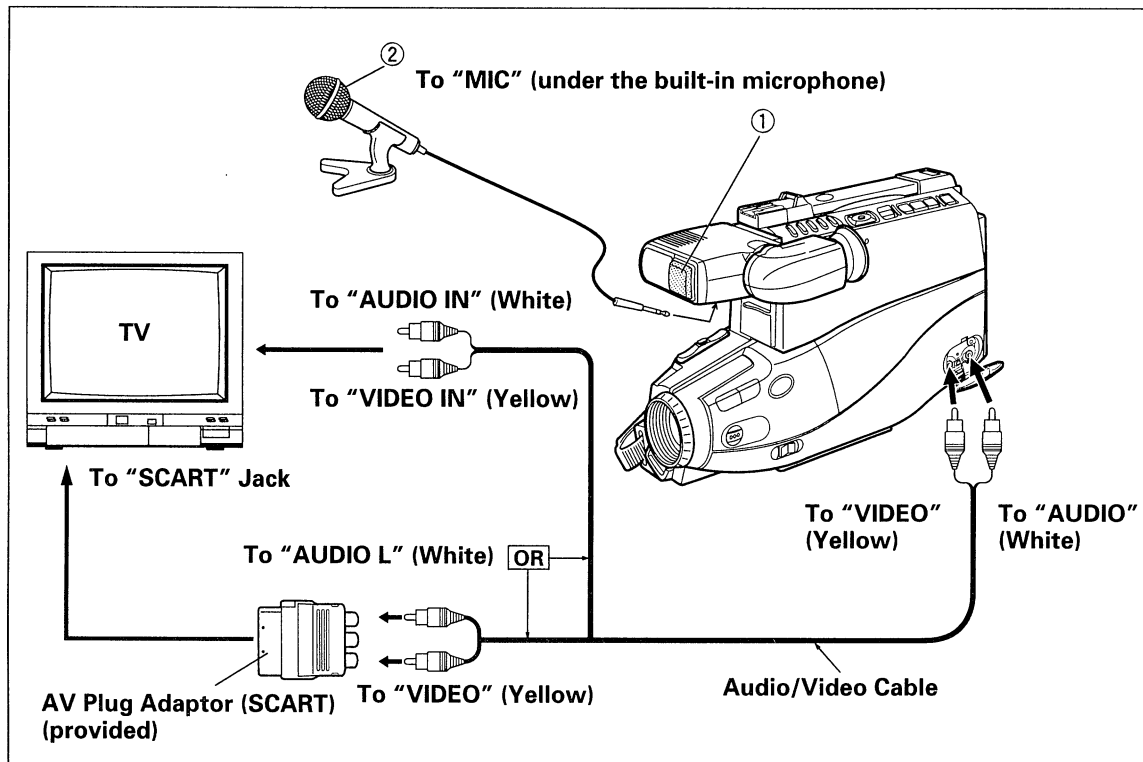
**NOTE:** When the remaining tape time becomes less than five minutes, "TAPE END" flashes in the viewfinder.



## AUDIO DUBBING/VIDEO DUBBING

The audio dubbing feature lets you record new audio (sound) on a previous recorded tape without erasing the original video (picture). In audio dubbing, the previous audio is erased and replaced with new audio from the built-in microphone or external microphone.

The audio/video dubbing feature lets you record new audio and video on a previously recorded tape. While audio/video dubbing, the previous audio and video are erased and replaced with new audio from the built-in microphone or external microphone and video from the camera.



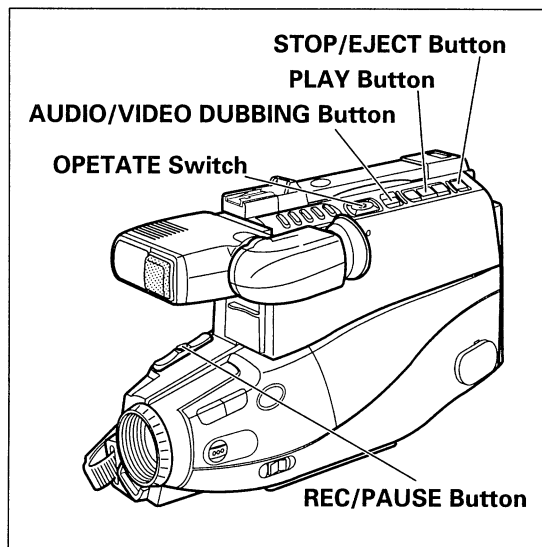
### NOTES:

- Sound from the built-in microphone and external microphone can be dubbed.
- Do not connect an external microphone when dubbing audio from the built-in microphone. Connecting an external microphone switches off the built-in microphone automatically.
- If your TV has "AUDIO/VIDEO IN", connect the audio/video cable directly to the TV.
- If your TV has "SCART" jack, connect the audio/video cable to the AV plug adaptor, and then connect the adaptor to the SCART jack of your TV.

### Audio dubbing

1. Insert a recorded tape.  
Be sure that the record safety tab is not missing.
2. Place the OPERATE switch in "VIDEO" position.
3. Play the tape and press the REC/PAUSE button where you want to dub audio.
  - The camera/recorder enters the still play mode.
4. Press and hold the AUDIO/VIDEO DUBBING button and then press the PLAY button once.
  - "A.DUB II" appears in the viewfinder.
5. Press the REC/PAUSE button to start audio dubbing.
6. Press the STOP/EJECT button to stop audio dubbing.

**NOTE:** The dubbing can be stopped automatically at the position where you want using the memory feature. To do so, turn the memory feature on by pressing the DISPLAY button ("M" appears in the viewfinder), and then press the RESET button at the point where you want to stop dubbing, then start dubbing. The dubbing will automatically stop when the counter reads "0:00:00M".



### Audio/video dubbing

The procedure for audio/video dubbing is the same as that for audio dubbing except for step 4 above. Follow the step below instead of step 4 for audio/video dubbing.

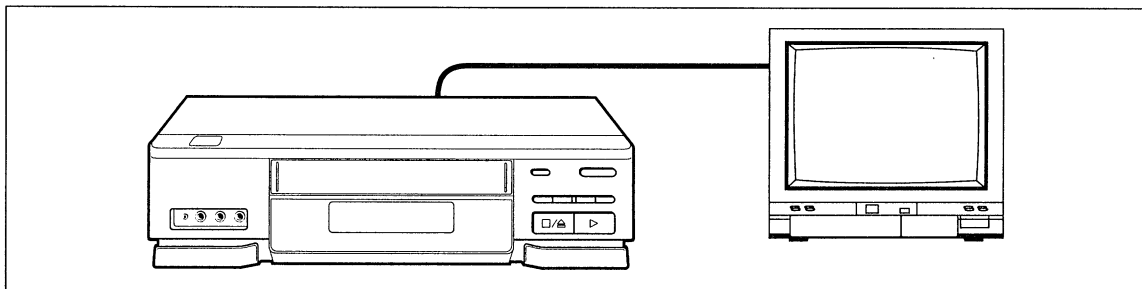
Press and hold the AUDIO/VIDEO DUBBING button and then press the PLAY button twice. "A/V DUB II" appears in the viewfinder.

## CONNECTIONS AND OPERATIONS FOR VIEWING THE PICTURE PLAYED BACK ON YOUR TV

To play back a tape recorded on your camera/recorder and view it on your TV receiver, you must connect the camera/recorder to the TV receiver using either audio/video cable or RF converter unit (optional).

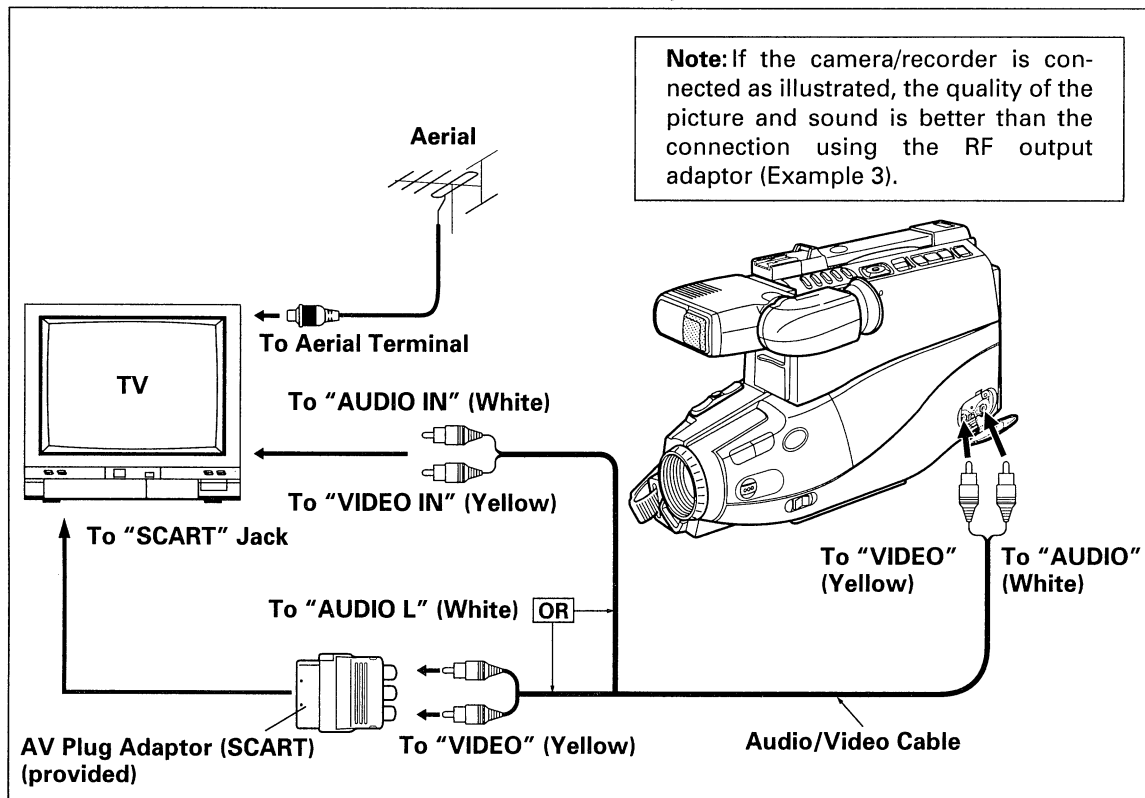
You also may play back the tape recorded by your camera/recorder on any other VHS video cassette recorder. The camera/recorder records and plays back in VHS standard speed (SP). The tape recorded in long play (LP) will not be played back on this camera/recorder.

### Example 1: If you have a VHS video tape recorder



1. Insert the video cassette recorded by your camera/recorder into the VHS VCR.
2. Press PLAY button on the VCR.

**Example 2: If your TV has SCART jack or AUDIO/VIDEO IN jacks,**

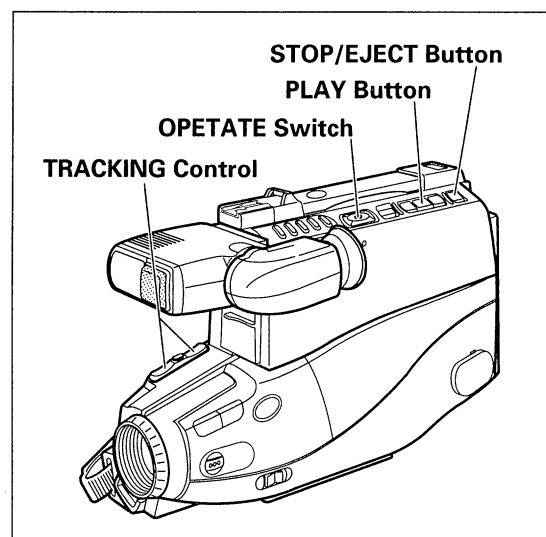


1. Connect the TV and camera/recorder as illustrated above.
2. Turn on TV and select video input.
3. Insert the cassette.
4. Set OPERATE switch to "VIDEO" position.
5. Press PLAY button.
6. After playing press STOP/EJECT button.

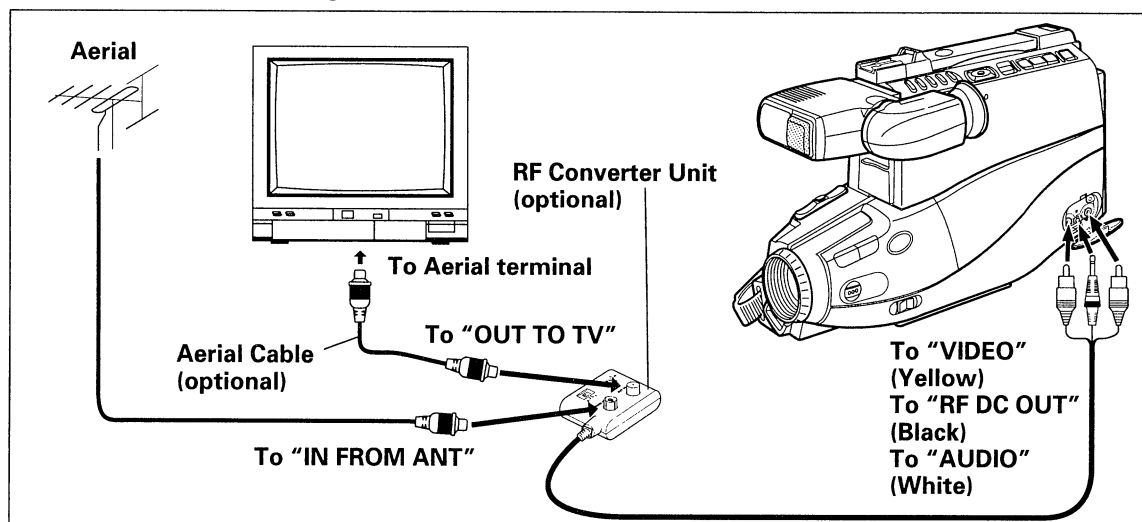
**NOTE:** When you use the AC adaptor/charger to power the camera/recorder for tape playback, move the AC adaptor/charger as far away from the camera/recorder as possible. Otherwise, noise may appear on the TV screen.

**Tracking adjustment**

When playing prerecorded tapes or tapes recorded by the recorders other than your own, black and white streaks may appear on the TV screen. If this occurs, press the TRACKING control (W or T) until the streaks disappear. When the cassette is ejected, the tracking is reset to normal.



**Example 3: If your TV is a regular TV,**



1. Remove the antenna cable from your TV set. Connect this cable to "IN FROM ANT" on the RF converter unit.
2. Connect the Aerial cable to "OUT TO TV" on the RF converter unit.
3. Connect the other end to aerial terminal on your TV.
4. Connect the connector cable from the RF converter unit to the camera/recorder as shown in the diagram above.
5. Turn on the TV and select an unused channel (CH37). Refer to "VIDEO CHANNEL SETTING" below.
6. Perform same procedures in steps 3 through 6 of "Example 2" on page 28.

**NOTE:** If you want to watch a TV programme with camera/recorder connected as illustrated, slide OPERATE switch of the camera/recorder to "OFF", or disconnect the RF converter unit from the camera/recorder.

## VIDEO CHANNEL SETTING

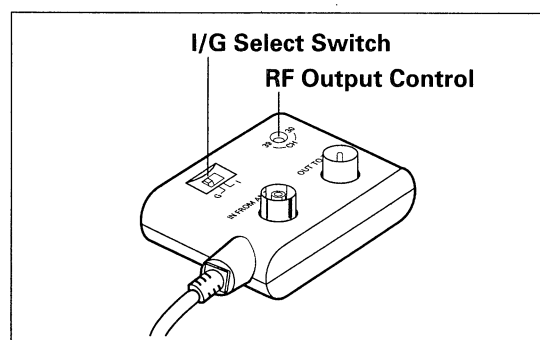
When viewing the picture played back by the camera/recorder on your TV, change over the I/G select switch of the RF converter unit matching your TV as well as to select the video channel on the TV.

1. Connect TV, RF converter unit and camera/recorder. (See above)
2. Set I/G select switch on RF converter unit as follows.

Colour TV broadcast system in your country	Position of I/G Select Switch
PAL (System I)	I
PAL (System B & G)	G

3. Turn on TV and select an unused channel (CH37). (In some cases this may be marked A/V.)
4. Insert the recorded tape to camera/recorder.
5. Set the OPERATE switch to the "VIDEO" position.

6. Press PLAY button of camera/recorder. Now playback picture appears on your TV. If the playback picture is not clear or channel 37 is used for broadcasting in your area, adjust the RF output control of RF converter unit using a small screwdriver and readjust your TV until the playback picture is clearly observed.



## FORWARD AND REVERSE SEARCH

When you press F.FWD or REW button during playback, the tape will be played back at a speed about 3 times faster than the normal playback speed, and you can easily locate a certain spot on the tape.

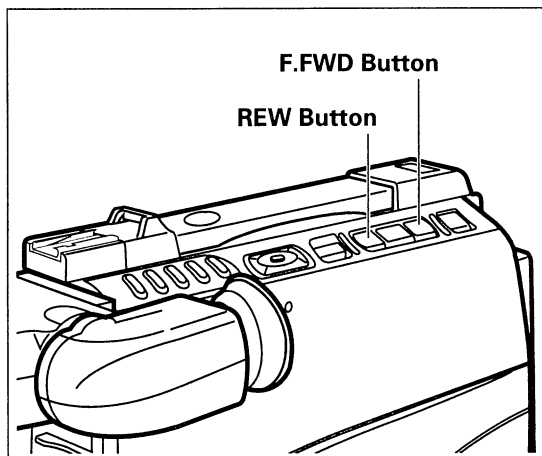
Press PLAY button to return to normal playback mode or press STOP/EJECT button to stop tape movement.

### NOTES:

- There will be some noise (interference) in the forward or reverse pictures.



- The colour of the picture during search may be pale depending on the TV used, but this does not indicate a fault.



## STILL

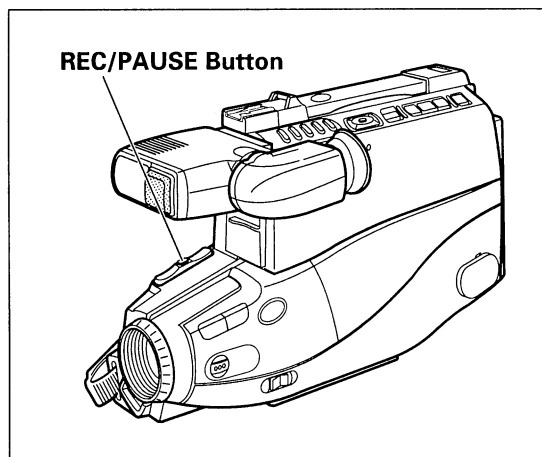
When the REC/PAUSE button is pressed during playback, a still picture can be seen. To start again press the REC/PAUSE button and playback will be resumed.

### NOTES:

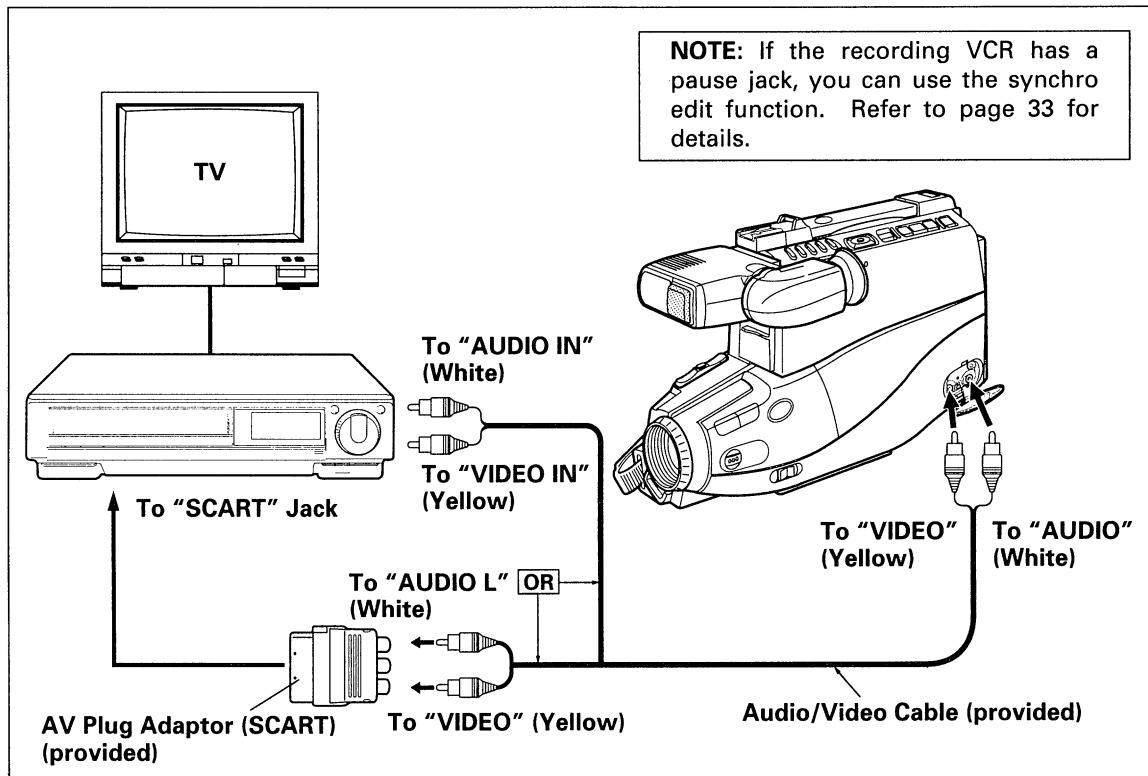
- There will be some noise (interference) in the still picture.



- The colour of the picture may fade when still playback is entered from playback depending on the TV used, but this does not indicate a fault.



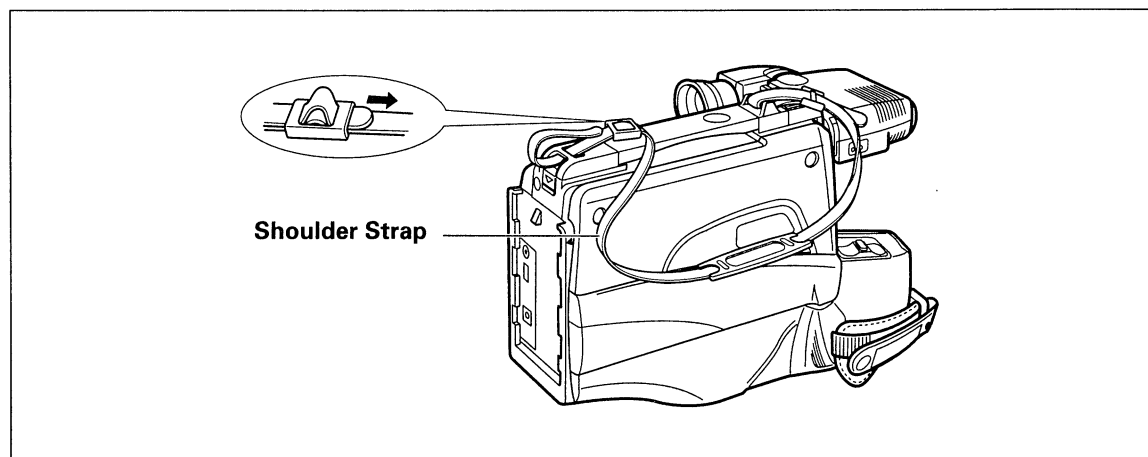
## CAMERA/RECORDER TO VCR DUBBING



1. Connect the camera/recorder, VCR and TV as shown in the figure, and then turn on their operate switches.
2. Insert the cassette used for editing into the camera/recorder and the cassette to be recorded into the VCR.
3. Play the tape on camera/recorder and record it on the VCR.

## HOW TO ATTACH THE SHOULDER STRAP

Attach the shoulder strap as illustrated below.



## USING THE BUILT-IN CAMERA LIGHT

Use the built-in camera light if you wish to shoot objects in dark places.

When the LIGHT switch is set to "AUTO", the camera light turns on automatically when the camera/recorder is pointed at objects in a dark place and turns off when it is pointed at objects in a bright place.

**CAUTION:** The power consumption of the built-in camera light is about half that of the camera/recorder.

Therefore, if the camera light is turned on when a fully charged battery is attached, the operating time of the battery falls to about a half.

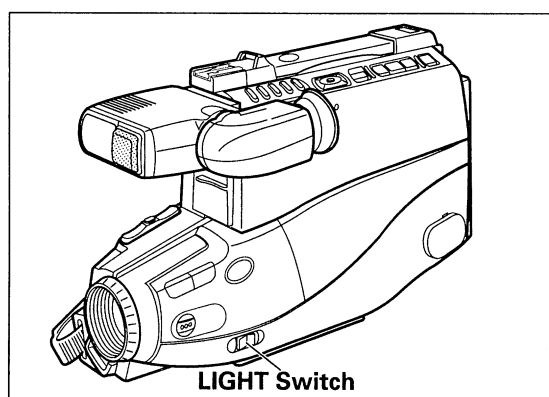
1. Make sure that a fully charged battery or AC adaptor/charger is attached.
2. Set the LIGHT switch to "AUTO" when required.

**NOTE:** When the LIGHT switch is set to "ON", the camera light will turn on whenever you make a recording.

### CAUTIONS:

- Turn the camera light on only when you need it, otherwise the operating time of the battery is shortened due to the power consumption of the camera light.
- When the LIGHT switch is set to "AUTO", the camera light does not turn on unless a cassette is loaded.

**CAUTION:** Do not hold the unit by the built-in camera light when carrying as this could cause a malfunction.



3. After use, set the LIGHT switch to "OFF" or set the OPERATE switch of the camera/recorder to the "OFF" position.

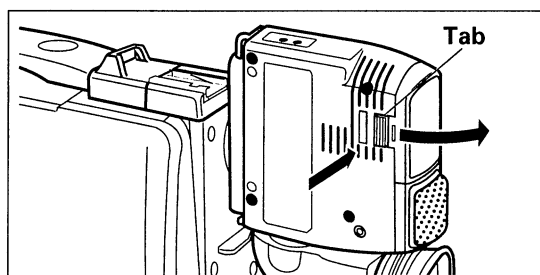
### NOTES:

- During operation and/or after use of the camera light, the front surface and lamp of the camera light will be very hot. To avoid burns or hair damage, do not touch them with your hand.
- When the camera light is on, do not allow water to drop on the light.

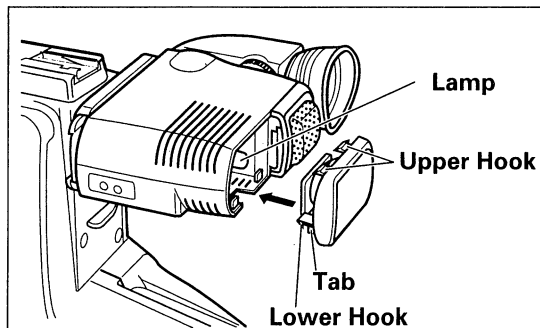
- When the camera light is on, avoid subjecting the camera light to impacts or sharp vibrations.
- Do not allow the cooling vents to become blocked. Also, do not cover the camera light with paper or other objects, since the air flow will be interrupted, resulting in possible overheating hazard.
- Never use the camera light in the vicinity of explosive or highly inflammable materials.
- After using the camera light, cool the camera light section sufficiently before storing the camera/recorder in the case.
- If the lamp blows, consult your nearest dealer. Replace only with the specified lamp (optional) to reduce the risk of fire.

### To replace the lamp of camera light

- To remove the front case, press and hold the tab, then remove the front case.



- To replace the front case, pass the lamp through the hole of the reflection plate then attach the upper hooks to the camera light, and then attach the lower hook to the camera light.



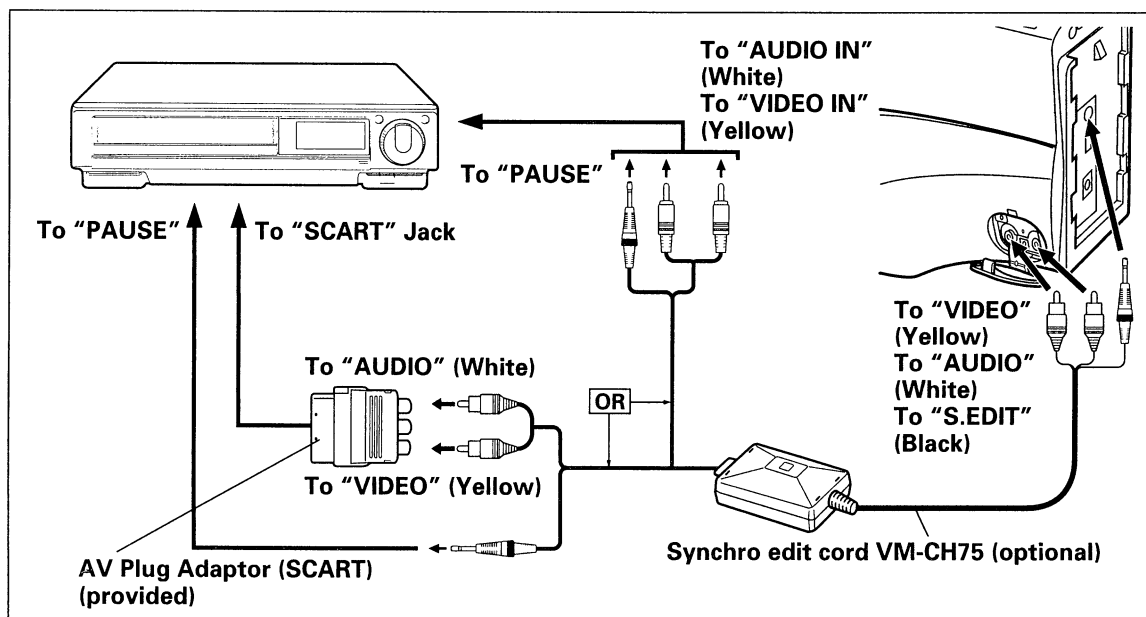
### NOTES:

- After using the camera light, cool it sufficiently before replacing the lamp to avoid accidents including burns because the camera light section such as the lens, lamp socket, etc. become very hot.
- Do not touch the lamp directly with your fingers. It may shorten its service life.
- When the lamp is replaced, or when the front case of the camera light is removed, make sure the front case is attached to the camera light properly.
- Consult your nearest service centre when replacing the lamp.



## SYNCHRO EDIT (By using optional synchro edit cord VM-CH75)

Synchro edit allows your camera/recorder to control a compatible VCR (one that has a camera pause jack) while tapes are being copied from the camera/recorder to the VCR. This is convenient when you want to record only selected segments from a previously recorded tape.



1. Connect your camera/recorder to a compatible VCR as shown above. An optional synchro edit cord is required.
2. Insert the recorded tape into the camera/recorder.
3. Insert the blank tape into the recording VCR.
4. Press PLAY button on the camera/recorder and then REW or F.FWD button on the camera/recorder to search to the approximate position of the tape on which you want to dub a picture.
5. Press PLAY button on the camera/recorder again to search the exact position where you stop dubbing and then press the REC/PAUSE button on the camera/recorder.
6. Press the DISPLAY button to turn the memory feature on ("M" appears at the end of the counter) and then press the RESET button so the counter reads "0:00:00M".
7. Press REW button on the camera/recorder to rewind the tape to the approximate position from which you want to start dubbing.
8. Press PLAY button on the camera/recorder, and when the exact position from which you start to dub is reached, press the REC/PAUSE button on the camera/recorder.
9. Press Record button on the VCR. The VCR automatically enters record/pause mode.

**NOTE:** If the VCR begins to record instead of pausing, you will need to change the position of the switch on the synchro edit cord. Stop the VCR, change the switch, and then press Record button on the VCR again.

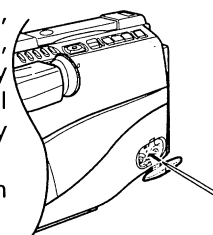
10. Pressing REVIEW button on the camera/recorder puts the camera/recorder in the review mode for several seconds and then into the playback mode.  
The recording VCR starts recording and stops automatically when the counter reading of the camera/recorder reads "0:00:00M".

### NOTES:

- Pressing REW, F.FWD, STOP/EJECT or the REC/PAUSE on the camera/recorder automatically put the VCR into the record/pause mode. This allows you to search (forward or backward), fast-forward or rewind the tape in the camera/recorder without disturbing the tape in the VCR.
- To search forward (or backward), press F.FWD (or REW) button. When you press PLAY button, the camera/recorder will resume normal playback. To begin copying again, press the REC/PAUSE button and then the REVIEW button.
- To fast-forward (or rewind) the tape, press STOP/EJECT then F.FWD (or REW). To begin copying again, press STOP/EJECT, then PLAY, then the REC/PAUSE to pause the camera/recorder, and REVIEW to begin copying.

## TROUBLESHOOTING

Symptom	Check Point & Correction
The cassette holder cannot be opened when you press the STOP/EJECT button in the stop mode.	Connect the power source.
Cassette cannot be inserted into cassette compartment.	Load cassette in direction indicated by arrow on cassette.
Picture does not appear in the viewfinder.	Remove the lens cap. Set OPERATE switch to "CAM".
The camera/recorder can not go into the recording mode, even when the REC/PAUSE button is pressed.	The cassette has had the erase prevention tab removed. Stick a piece of cellophane tape over the erase prevention hole or select a different cassette.
	Set OPERATE switch to "CAM".
	The "■" indication in the electronic viewfinder flashes to indicate battery is discharged. Try another battery or charge the battery.
PLAY button cannot be engaged.	Set OPERATE switch to "VIDEO".
Interference on playback picture.	Adjust the TRACKING control (power zoom switch T/W).
	When you see the playback picture on your TV, adjust fine tuning knob on television set to obtain the best picture.
	The pre-recorded tape is LP recording. This camera/recorder is for use in SP recording only.
Picture is out of focus. Auto-focus does not operate.	Make sure that "FOCUS" does not appear in the viewfinder. If "FOCUS" is displayed, press the AUTO/MAN FOCUS control buttons simultaneously so that it goes out.
Power is not turned on and no button operations are accepted.	Remove the power source, and after about one minute, push the reset switch gently using a toothpick, etc. until you feel a click. The display will be reset. Then set the information again.

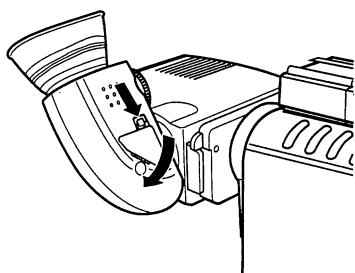


## MAINTENANCE

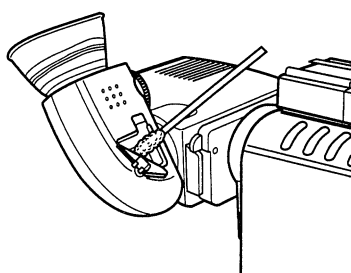
1. To maintain the optimum performance of this camera/recorder, regular periodic maintenance is required. Your dealer will advise you further.
2. Maintenance and adjustments may not be carried out by the user. In all cases of difficulty or doubt, consult your dealer.
3. Head cleaning
  - Dirt accumulated on the video heads after a period of time may cause the playback picture to become blurred or part of the video information to be lost. This does not mean that the recorded programme has been erased but head cleaning is required which must be carried out by your dealer.
  - Under no circumstances we do recommend users to attempt to clean the video heads as this is done only effectively by removal of the cover to gain access to the video heads and other parts which require cleaning, which would expose live conductors and present a "shock" hazard.
  - In regard to the various head cleaning tapes which are currently available on the market, these can cause damage and also reduce the operational life of the video heads if used incorrectly. Please consult your dealer as to the suitability of any cleaning aids before purchase.

### ■ CLEANING THE INSIDE OF THE ELECTRONIC VIEWFINDER

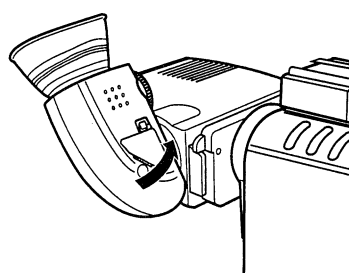
If dust or foreign matter adheres inside the viewfinder, clean it by using the following procedure.



1. Push the tab and hold it, then open the cover.



2. Clean the picture tube face and lens.  
To prevent scratching, use a soft non abrasive cloth, swab or lens cleaning paper.



3. Close the cover.

## SPECIFICATIONS

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### ■ General

Power requirements	9.6V DC
Power consumption	7.3 watts (in the manual focus mode)
Operating temperature	0°C to 40°C
Operating humidity	< 80%
Dimensions	111 (W) x 205 (H) x 311 (D) mm
Weight	2.0 kg

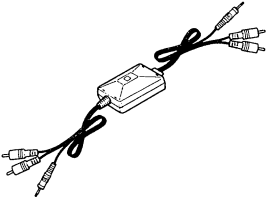
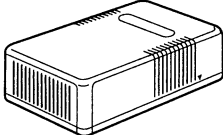
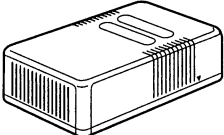
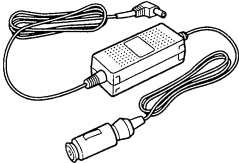
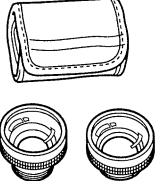
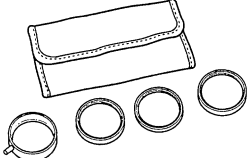
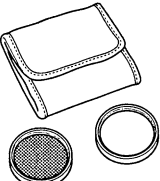
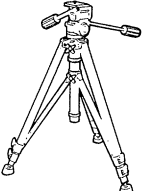
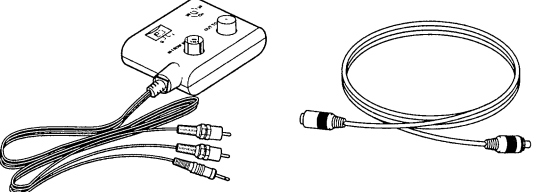

### ■ Video recorder section

Format	VHS
Record/playback system	2 video record/playback heads plus one flying erase head
Video signal	PAL colour & CCIR monochrome signals 625 lines
Tape speed	23.39 mm/sec.
Recording time	240 minutes with an E-240 cassette (SP)
Video output	1.0 Vp-p, 75 ohm
Mic input	– 68 dBs, more than 1 kohm
Audio output	– 7.8 dBs (316 mVrms), less than 1 kohm
Fast forward/rewind time	Less than 8 minutes with E-180 cassette

### ■ Camera section

Scanning	625 lines/50 fields/25 frames
Required minimum illumination	2 lux
Camera device	1/3" CCD
Lens diameter	46 mm
Viewfinder	2/3" B/W

OPTIONAL ACCESSORIES

Synchro Edit Cord	Battery Pack		Car Battery Cord
VM-CH75 	VM-BP66 (for standard play) 	VM-BP67 (for long play) 	VM-CC70E 
Conversion Lens Set	Filter Kit	Filter Kit	Tripod
VM-CL12TW 	VM-FL60K 	VM-FL46K 	VM-TR80 
RF Converter Unit		Lamp for Camera Light	
VM-RF81E 		BQ407-33000A*  (Part No. DP10122)	

\* Consult your nearest service centre when replacing the lamp.

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